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PC WORLD

February 1994 $3.95

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Of All the Hottest New PCs
On the Market Today

- Top 20 Budget PCs
- Top 20 Power PCs

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Circle 201 on reader service card

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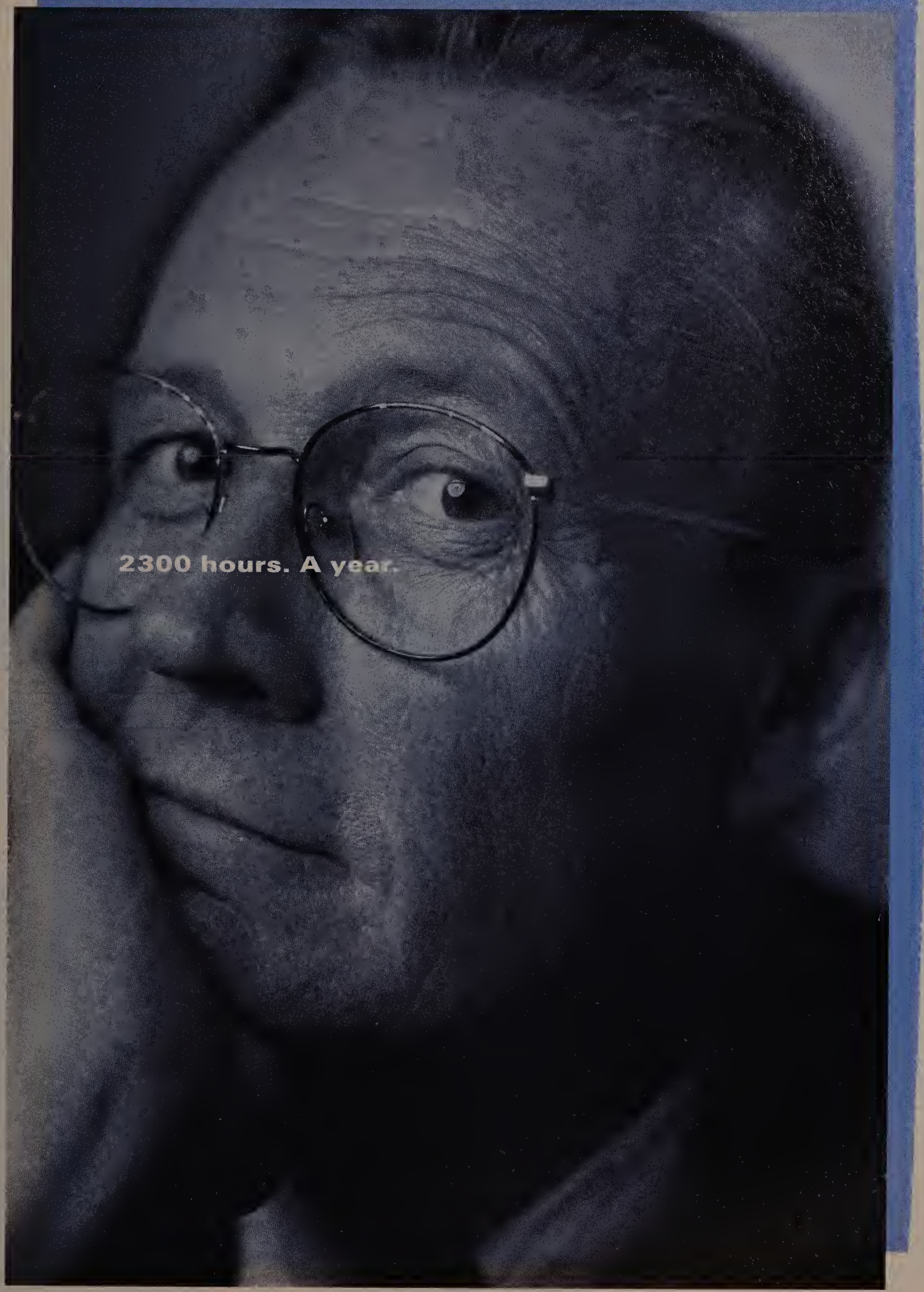
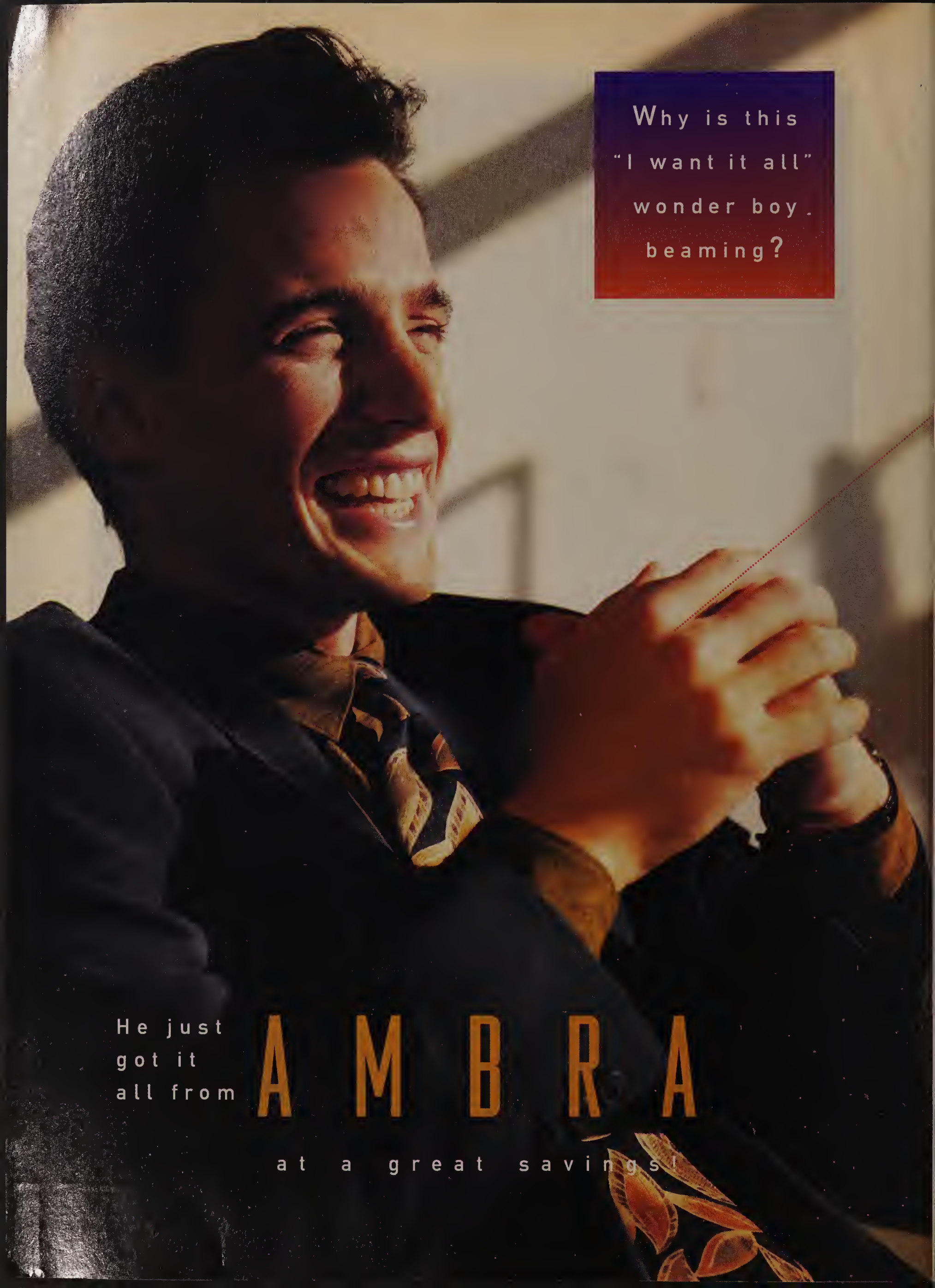


Circle 201 on reader service card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- Mouse

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- 8MB RAM
- 128KB processor cache
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- 5 drive bays
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- 340MB hard disk
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- Mouse

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- Intel Pentium processor, 60 MHz
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- 256KB processor cache
- 3.5" 1.44MB diskette drive
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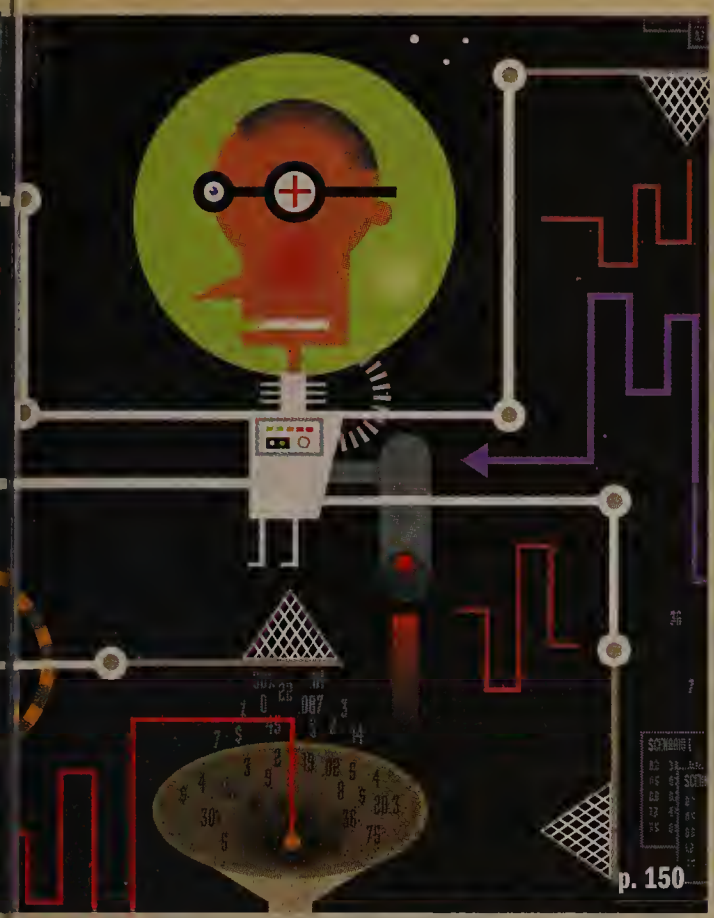
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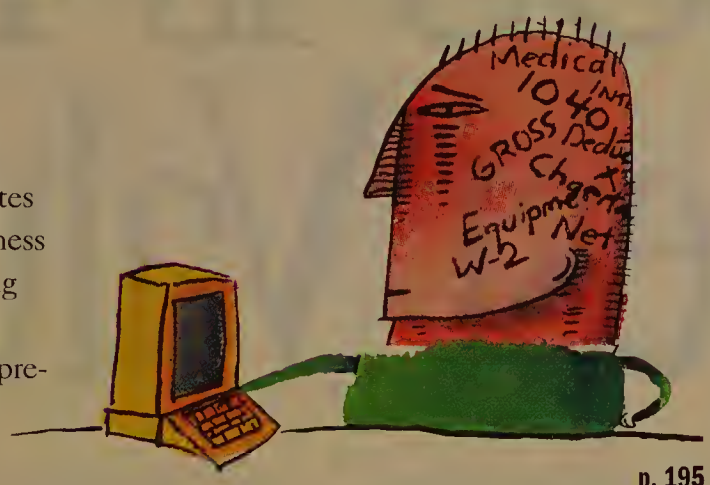

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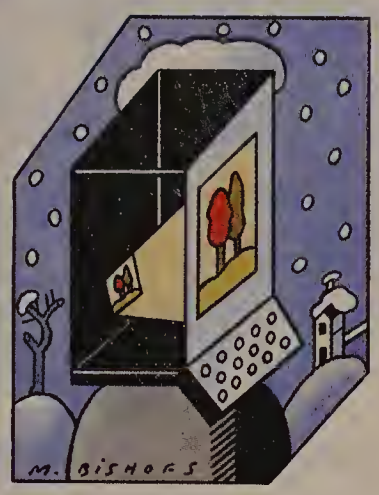

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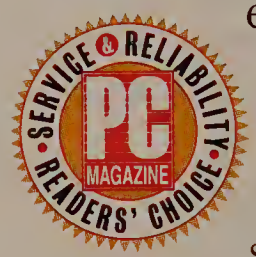

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486DX-33 ..... **$1395**
Lease $59/month
486DX-50 ..... **$1495**
Lease $63/month
486DX2-66 ..... **$1695**
Lease $61/month

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- Two VESA local bus, five 16-bit and one 8-bit expansion slots
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- 101-key space-saving keyboard
- MS-DOS 6.2 w/Tools

PACKAGE 2

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- Microsoft Mouse
- MS-DOS 6.2 w/Tools, Windows for Workgroups 3.11

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- Two VESA local bus, five 16-bit and one 8-bit expansion slots
- Six-bay desktop w/2 cooling fans
- 101-key space-saving keyboard
- Microsoft Mouse
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- Choice of Lotus Application

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486DX-50 ..... **$2795**
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- Two VESA local bus, five 16-bit and one 8-bit expansion slots
- Six-bay desktop w/2 cooling fans
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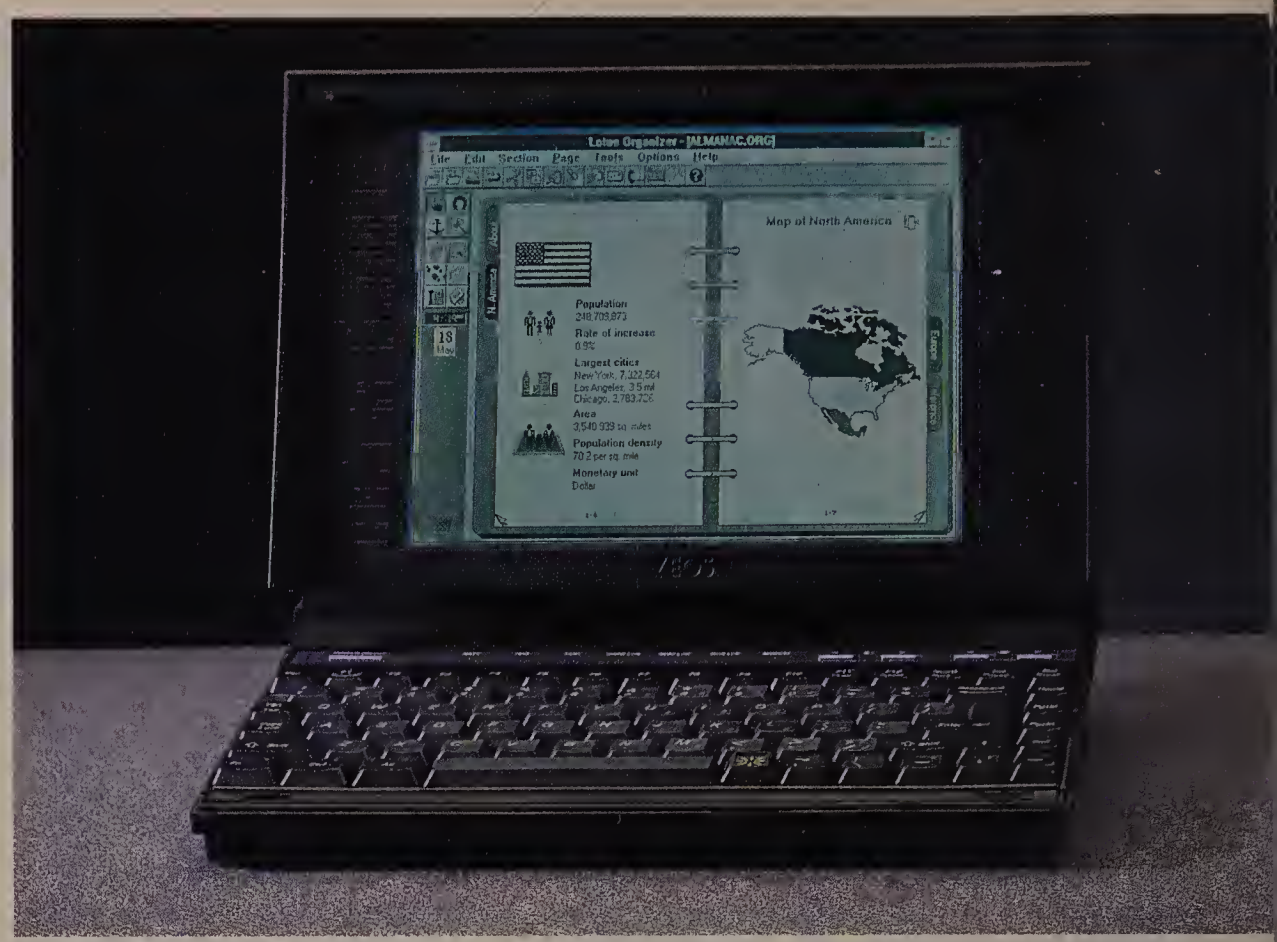

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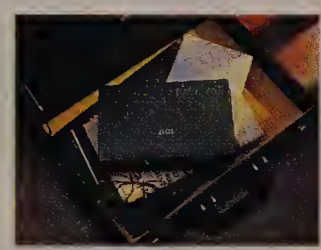

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The PC World Top 20

In telephone calls and at computer shows, our readers have asked questions that made us reexamine the way we review PCs, even though the popularity of our reviews has reached an all-time high. Some typical comments:

"How do the PCs in this month's review compare to the ones reviewed last month? Should I buy last month's Best Buy or this month's?"

"This month you recommend the best Windows PC under $2500, but I'm looking for a killer high-end system. When will you review those? I'm hoping to buy one soon."

"I'm glad you reviewed notebooks this month, but all the machines you covered were out of my price range. When will you cover more affordable notebooks?"

And PC vendors have asked for more timely reviews now that many models remain on the market only six months or even less.

"You do a great job on reviews, but by the time your review appears," says one vendor, "I'll have an all-new product line. There isn't one PC I can send you that will still be on the market five months from now."

Office, Home, and Travel PCs

In response to these comments, we've worked hard during the past several months to develop a new review approach. First, we cut seven weeks from our production schedule to bring you more timely information. Second, we're asking vendors to submit only their latest models. Third, to ensure that we always have a recommendation relevant to your needs for the office, the home, the home office, and travel, we'll recommend systems each month in four categories: power desktops, budget desktops, power mobile PCs, and budget mobile PCs. Fourth, we'll present our recommendations by naming the PC World Top 20 each month in these categories. We'll put the best computer in each category at the top, and it will stay there until a newcomer proves itself to be better.

In "The PC World Top 20," you'll find the first PC World Top 20 Power Desktops (the blue tinted table) and Top 20 Budget Desktops (the purple tinted table). We'll publish an updated Top 20 in these categories in every future issue. Starting in April, we'll also publish the PC World Top 20 Mobile PCs, consisting half of Power Mobile PCs and half of Budget Mobile PCs. We'll comb the world each month for new contenders in all of these categories. Whenever you need a new PC or when a friend or colleague asks you for advice, you can find recommendations of the very best in the latest issue of *PC World*.

As with the Top 20 in football, you'll want to check our rankings each issue to see who's number one. And as with the best-seller lists in book publishing, you'll know how long each PC has stayed on the list and where it ranked last month. You'll see an overall rating, a performance rating, and a service rating, all on a scale of 1 to 100. You'll see other vital facts, such as latest estimated street price, CPU type, standard memory, standard hard drive capacity, system bus, monitor size and dot pitch, and the vendor's toll-free number (if available). You'll find in each issue a capsule review of each new contender, as well as instructions and a number for ordering a fax of previously published reviews if you can't find a back issue. Finally, you'll get a brief summary on what distinguishes each PC in the Top 20.

Our hopes that you will enjoy the PC World Top 20 approach are buoyed by our own enjoyment of the process. We're interested in whether a hot new contender can knock off the defending champ, and whether, in this intensely competitive period, any company will be bright and resourceful enough to create a PC so appealing that it will stay atop the PC World Top 20 in a category for six months or even more.

Faxed Service-and-Support Ratings Too

This month's review also made some use of the first batch of results from your faxed service-and-support ratings of PC vendors. We received more than 10,000 faxes in the first month, and the pace continues. Thanks to you, we will soon have the most timely and substantial service ratings available. Your faxed ratings will play a bigger role in determining rankings in the PC World Top 20 in future issues.

Keep checking the PC World Top 20 to see who's number one, how long each PC has been on the list, and where it ranked last month.

To keep up with the latest trends in computing, read David Coursey's *Inside Source*. Subscribers to his *P.C. Letter* pay hundreds of dollars a year for his prognostications. Coursey gives readers their money's worth in both insight and entertainment. He has demanded the recall of the Newton, tried to place an order for a Microsoft At Work carving knife, forecast delays in the long-awaited plug-and-play era for the PC, and told the fortune of the PowerPC faster than a speeding Pentium. Be sure to read his thoughts in this issue on the future of applications software.

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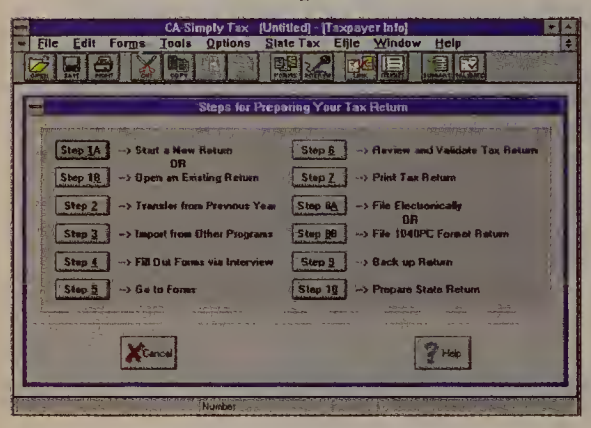
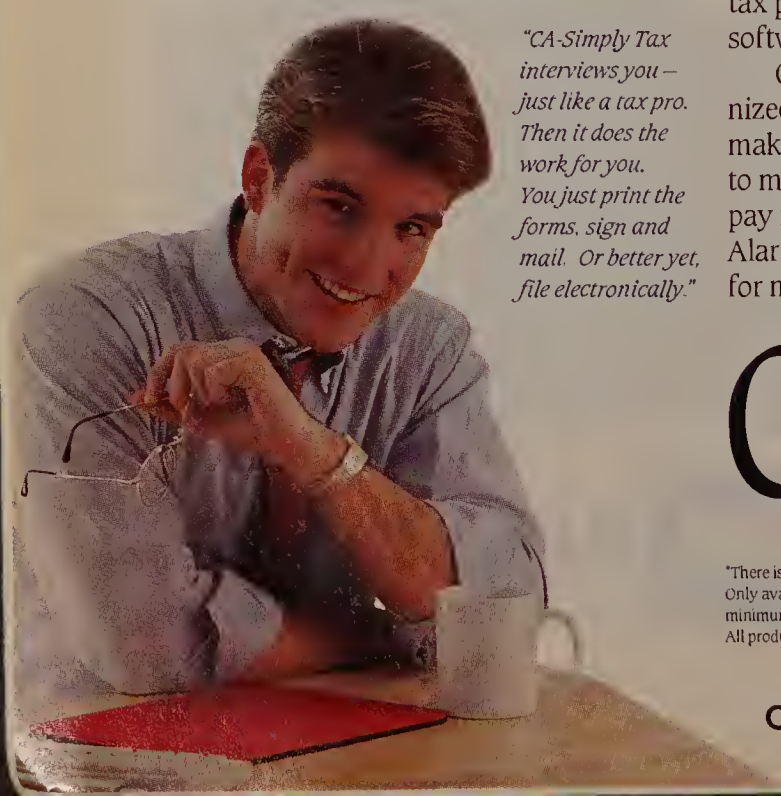


First, it was free money. Now, it's a free tax break. For a limited time, CA is offering you our new tax software, CA-Simply Tax,™ for free.*



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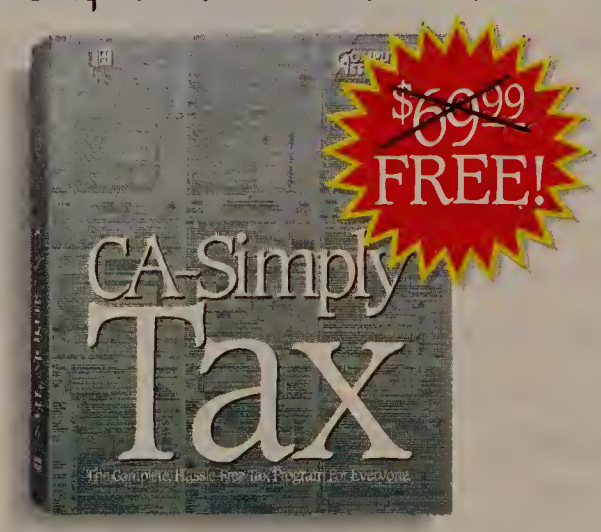

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CA-Simply Tax interviews you just like a real tax pro. After you answer the questions, the software does the work for you.

CA-Simply Tax even helps you get organized. A built-in tax preparation checklist makes sure you bring everything to the table to maximize your deductions. So you won't pay more than you have to. A Tax Deadline Alarm even warns you of upcoming deadlines for making estimated tax payments.

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There are lots of extra features, too. Like a built-in Tax Planner to help you with next year's projections. And a "What If" which allows you to assess different tax scenarios to determine which works best for you. All of which help you save money and take all the deductions that are coming to you.

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*There is a nonrefundable $9.95 shipping and handling charge. (Allow up to 3 weeks for delivery.) Have your credit card ready: Visa, MasterCard, AmEx and Discover accepted. Only available in the US. Windows 3.1: requires 2Mb of RAM (4 recommended) and 5.5Mb of hard disk space. DOS 3.0: 640K (minimum 500K of free RAM required) or greater, minimum 3.5Mb of free hard disk required. Offer valid through April 15, 1994. © Computer Associates International, Inc. Islandia, NY 11788-7000.
All product names referenced herein are trademarks of their respective companies.

Circle 42 on reader service card

In Defense of PDAs, Buyer's Prerogative, Protecting Your Laptop

PDAs: For the Discerning Buyer?

Joe Abernathy's "Power in Your Palm?" [*Top of the News*, November] made me wonder how much time he spent with Apple's Newton MessagePad.

I've worked with my MessagePad for seven weeks. After two weeks it interpreted my handwriting correctly 90 to 95 percent of the time. It usually spells better than I do, and there's nothing "immature" about its presentation, despite the lukewarm press it's getting.

Those who pan the MessagePad because it won't immediately interpret their handwriting probably expect anything they buy to work with no additional effort on their part. The MessagePad conforms to its owner's unique characteristics. Using a personal digital assistant for a few minutes at a demo kiosk or in the office is not a fair basis for judging it.

Ross Herbert, O'Fallon, Illinois

Author's response: Before reviewing the Newton and the Tandy Z-PDA Zoomer, I worked with them for three months, including extensive field testing and sessions with their product managers. I stand by my conclusion that the Newton is useful only for repetitive, form-based applications. Sure, it can learn words, but what use will it be to the people who want a PDA only for writing down the names and addresses of people they meet? To the Newton, those are all unfamiliar proper nouns, so it will never be any good at recognizing them. This is beta-level technology. —*Joe Abernathy*

"No Name" Spells Savings

I enjoyed the fair, well-balanced article "Brand Name vs. No Name" [November]. I work for a small computer reseller and held my breath when I started your article, wondering if anyone would ever order a clone again.

The article is honest about the advantages and disadvantages of ordering brand-name, mail-order, or local-store PCs. But you fail to mention that customers often get proprietary architecture when buying a brand-name computer, which means expensive upgrades and repairs. Today I quoted $500 for a new box; Compaq wants to charge the same customer $1000 to replace the motherboard. I'll take the risk of an open-architecture clone!

Nicole Chardenet, Torrington, Connecticut

Silver Fox Strikes Back

Maybe *PC World* can afford to accept advertising that suggests older women are computer ignorant and silly, but can NEC afford to pitch its CD ROM reader that way? NEC's November ad [page 241] shows hot and cool young faces saying, "I want it," "I need it," but a fearful grimace on an older woman's face as she asks, "Does it hurt?"

As a woman who started with IBM 33 years ago, I suggest NEC consider how much buying power our gnarled old hands hold. Picture a sly silver fox saying, "I can't get enough of it" about NEC's CD ROM. Keep the humor, lose the slam against potential customers.

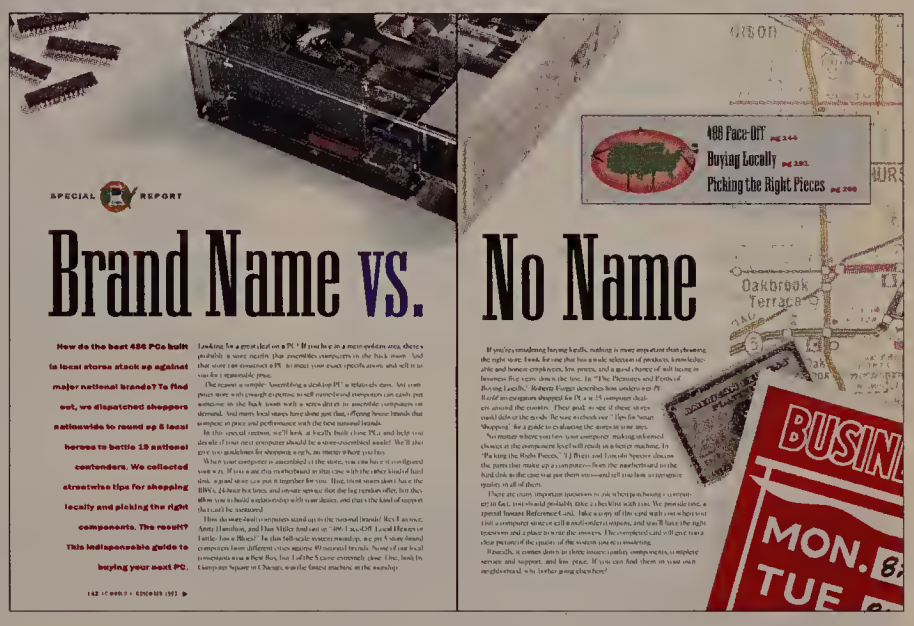
Charlotte Melichar, Falls Church, Virginia

NEC's response: NEC looks at its customers as more than end users; it views its customers as real people who want and need the best CD ROM experience. Our advertising was developed to capture the attention of those real people and to begin a dialogue with them that breaks down any fear of technology and helps build a comfort level with technology products. We believe our advertising accomplishes that objective. We certainly never meant to offend anyone. —*Marcus Miller, vice president, Advanced Media Products*

Fun for Scott and Brett

To the people who designed the "real-life" test in "Showdown on the Desktop: NT Challenges OS/2 2.1" [November]: How about including a third day when Scott and Brett are stuck in front of a Mac, and a fourth day when they use a UNIX system? I don't know about NT, but as far as I know, nobody ever claimed you could sit down in front of OS/2 and use it without a learning period. No one was more opposed to using OS/2 2.0 than I, but 2.1 changed my mind. You have to take the time to learn how to use an operating system and how to make the appropriate changes for a given situation.

Larry MacG via PC World Online



Chalk One Up for Windows 3.1

Finally, after six months of hype, a real-world face-off between OS/2 and NT. "NT Challenges OS/2 2.1" cleared up the confusion about what these systems can and can't do. I read it three times and decided to stick with Windows 3.1, at least for now.

Lary Harris, Cary, North Carolina

Desqview Does Multitasking

In October *Letters* ["Wondering About Windows"], J. S. Bach-Hansen wondered why it's necessary to load such an enormous environment as Windows to

multitask. The answer is simple: It isn't.

Sadly, the media has long refused to acknowledge Quarterdeck's Desqview, an environment that lets users multitask DOS apps while taking only about 800K of disk space for both Desqview *and* QEMM, the bundled memory manager.

Users don't have to put up with "a chaotic mess of icons and windows," don't have to waste a lot of disk space, and don't have to snub their DOS applications. I'm shocked that more people don't know about Desqview.

Andy Bender, Los Angeles

Advice for Board Buyers

Thanks for the article on video boards ["Turbocharging Windows," October]. I have a few suggestions that may interest your readers, having just tracked down a new video board myself.

Windows accelerators are great, but how well does the board manage DOS programs? Several boards I tried flew through Windows programs but were very slow managing DOS programs.

Buy from a vendor that will exchange the board or refund your money.

Check the board running some video-intensive programs under Windows—for example, see how long it takes to load several images under Corel Paint.

Can the drivers and programs bundled with the board be *un*installed with ease, or do they change WIN.INI, SYSTEM.INI, and more? Can the board run Windows at the correct screen size on your monitor, in both enhanced and standard mode?

Warren DePaul, Flushing, New York

Sharing the Wealth

I wish *PC World* would create a separate section in the magazine for monthly shareware reviews and helpful hints on downloading shareware. Not everybody wants the big expensive products—or has a 486DX2-66 with a 1GB hard drive to run them. How about a page or three in each *PC World* for shareware?

AFWilliams via PC World Online

Editor's note: Check out this month's feature "The Best of Business Shareware."

CompuAdd Rebuttal

We take issue with the statement in the November *Consumer Watch* that CompuAdd's customers are "struggling" along with the company, which filed for Chapter 11 protection in June.

Although no company in this industry bats a thousand with its customers, CompuAdd has maintained an 11-year track record of excellent customer service and support. We've worked very hard to uphold this tradition. It differentiates us from many competitors, both smaller and larger.

Since the filing, we have been cash-constrained by virtue of meeting financial obligations, and some of our shipments have not been as timely as planned. However, we have been diligent in honoring all product warranties, refunds have been issued on a business-as-usual basis, and there has been no downtime in our technical support operations. In addition, we took extra steps to ensure that customers calling discontinued retail stores were automatically routed, at no cost to them, to CompuAdd's direct marketing and centralized ▶

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Circle 45 on reader service card

INTRODUCING THE EVOLUTION V ST

from ALR. As the newest member of ALR's EVOLUTION V family, this system delivers true record-breaking 60 or 66-MHz Pentium processor horsepower. Power that has earned the ALR EVOLUTION V family top honors from BYTE, InfoWorld, and PC/Computing. Engineered to maximize the Pentium processor, this powerful system boasts a 64-bit cache/memory design with your choice of 32-bit local bus architectures; VESA VL or PCI.

Large enough to hold gigabytes of storage and eight expansion cards, yet small enough to fit on a desktop, the EVOLUTION V ST is perfect for both small networks and expansion hungry power users. With four drive bays accessible from the front (six total), it's the ideal system for advanced desktop publishing, multimedia design, and other applications requiring both CD ROM drives and removable hard drives.

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External Cache	256-KB	OPTIONAL add $325*
VESA Local Bus IDE	YES (VL Systems)	NO
Integrated SCSI-II	YES (PCI Systems)	NO
Drive Bays	6	3
Available Slots	8	3
Power Supply	250 Watts	145 Watts
Warranty	5 Year/15 Month	3 Year
Price	**$2995**	**$3024** *$2,799 plus $325

ALR bests three other 60MHz Pentium systems

Winstone 94 Version 1.0

Advanced Logic Research Inc. Evolution V™	82.2
AST® Research Inc. Premmia™ LX P/60	72.6
Compaq® Computer Corp. Deskpro™ 60/M	69.2
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Longer bar indicates better performance.

PC Week November 1, 1993 page 21. Winstone 94 measures overall system performance, using one script for each 12 popular Windows applications. It computes the amount of time each script takes to finish, and uses those times to produce an overall score. Timed results are weighted based on the relative market share of each 12 applications.

Starting as low as **$2495**

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- 60- or 66-MHz Pentium Processing
- Supports Pentium Write-Back Mode
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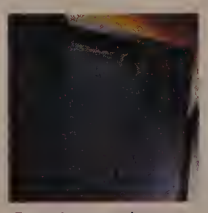

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You just saved a bundle on PCs. Now, who's going to save you from the people who have to use them?

Low price alone doesn't equal value. A PC that can't do what you need is a PC you just can't afford. Fortunately, AST's Bravo family now includes everything from notebooks to minitowers. All packed with features and power. Consider the low-profile Bravo LP, a powerful yet energy-efficient desktop with EPA EnergyStar approval. Also EPA-approved is the Bravo MT, an upgradable, enormously expandable minitower. To get excellent Windows performance at a low price, check out the Bravo LC with local bus graphics. And the Bravo NB gives you a powerful, advanced notebook you can actually afford. So before you choose, call us at 800-876-4AST. Your controller will like the price. Everyone else will like the computers.

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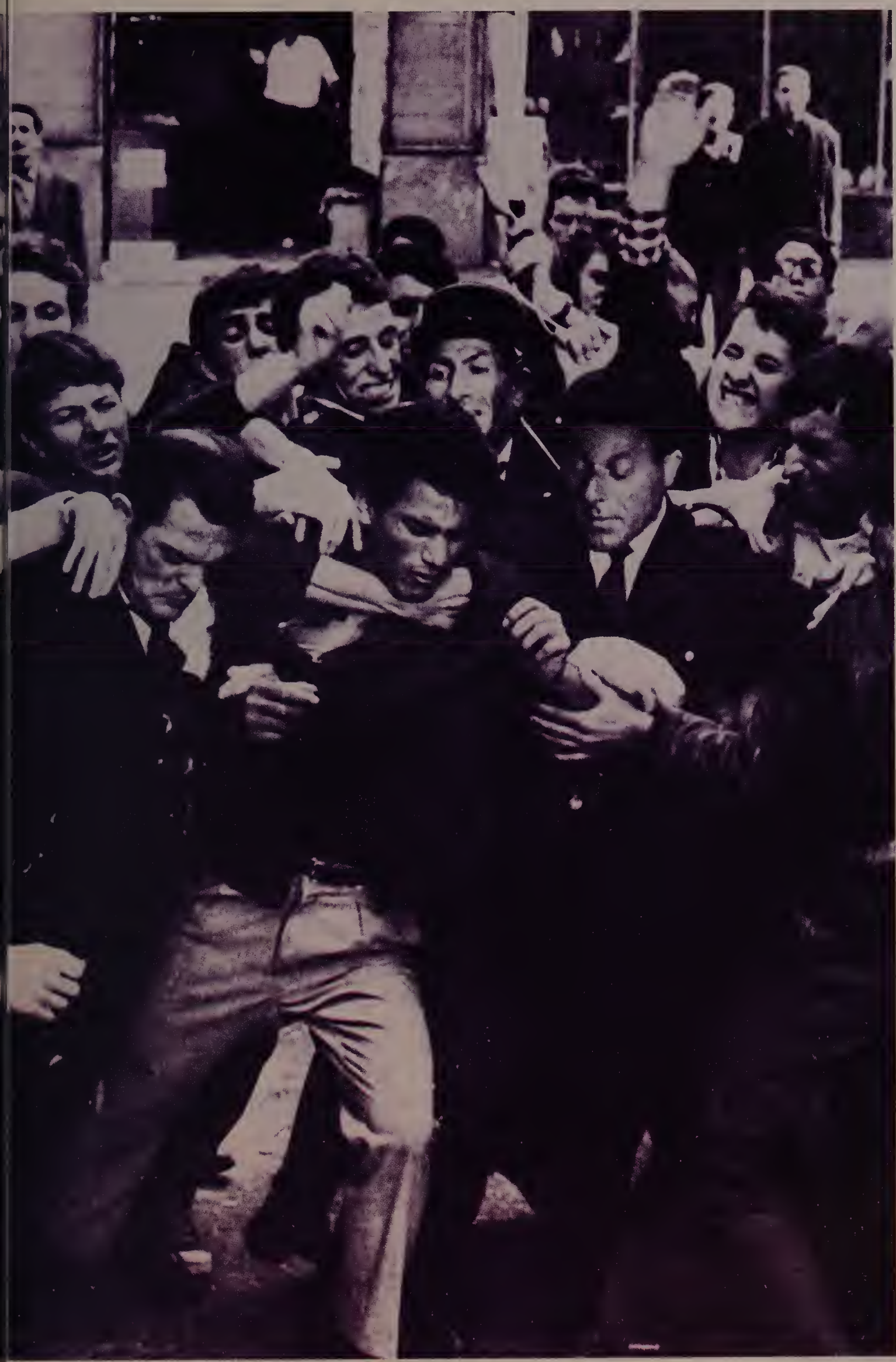

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*Minitower chassis. Six ISA slots, six drive bays. Intel 486DX/33 or 486DX2/66 microprocessor, upgradable to Pentium OverDrive. 200-watt power supply. Starting at $1300***

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*Notebook with Intel 486SX/25 microprocessor and integrated trackball. 9.5" monochrome, dual-scan color or TFT color display. One PCMCIA Type III slot. 20MB RAM. One-year carry-in warranty. Starting at $1699***

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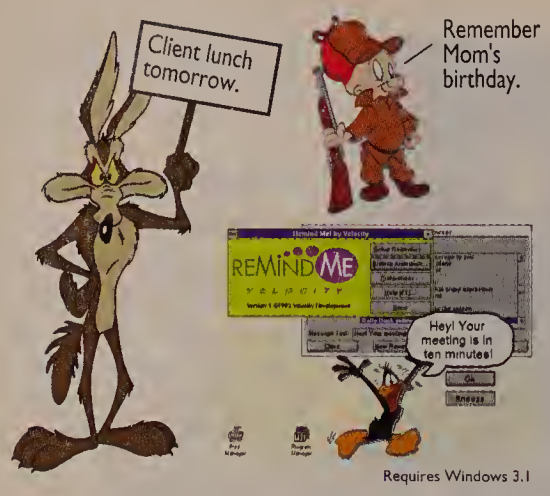

Requires Windows 3.1

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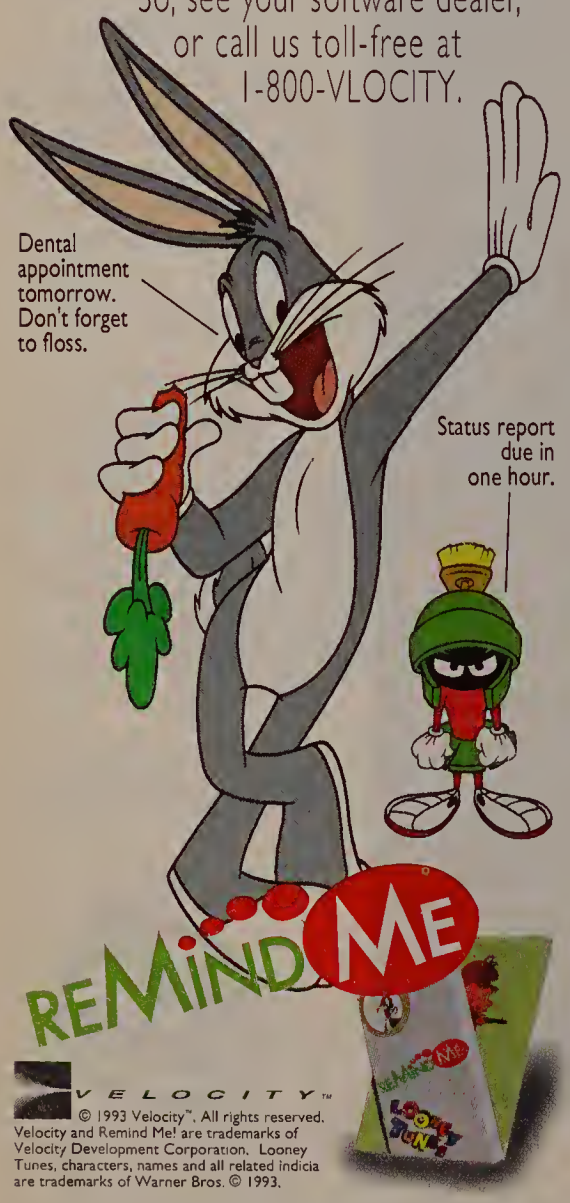

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Circle 192 on reader service card

service operations in Austin, Texas. By the time this letter is in print, CompuAdd will have emerged from Chapter 11 protection.

PC World enjoys a good reputation: That's why we're so disappointed the characterization of our customer focus wasn't more balanced and truthful.

Rick Krause, president, CompuAdd

Cover Your Laptop

A word of caution to readers: Make sure your laptop is covered by one of your insurance policies. Recently someone decided they wanted everything in my car, including my concealed laptop. My auto insurance didn't cover the laptop, and neither did my homeowner's insurance. Ouch.

Grasping at straws, I called Visa, since I'd purchased my machine with my credit card. Sorry, Charlie—Visa doesn't cover any item lost or stolen from an automobile. Good-bye $2000. Later my insurance agent called to tell me that if I'd had a separate rider for transporting the laptop, I'd have been covered. I hope all you laptop users get on the phone to your insurance agents.

Mad Broke But Wiser via PC World Online

Editor's note: *Consumer Watch* this month covers the topic of insuring your hardware.

Corrections and Clarifications

One more user group to add to the grand roundup in October's *Consumer Watch:* The PC and Macintosh Assoc., P.O. Box 35268, Tulsa, OK 74153; 918/747-8878.

October's "NT Applications: The Waiting Game" should have included IMRS's Hyperion as an application that will be available on the R4000/R4400 platform.

In the November *New Products* write-up of 1st Press, 1st Design, we listed an incorrect 800 number for GTS Software Products. The correct number is 800/236-1062.

The correct phone number for the online service Delphi, mentioned in December's "Small Office/Home Office," is 800/695-4005. We inadvertently listed the number for Delphi Information Sciences (310/452-7575), a corporation that supplies software products to the mortgage lending industry. Delphi Information Sciences is located at 2800 28th St. #205, Santa Monica, CA 90405. *PC World* regrets the errors.

PC World *welcomes your responses and ideas* *(see page 12 for contact information).*

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New brilliant Active Matrix display – 640 x 480 VGA with high-speed video system for lightning fast graphics.

The notebook industry's first 4mm, full-travel keyboard with the look and feel of a desktop system.

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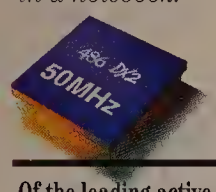
If you've been waiting for an active matrix color notebook with true desktop power, your wait is over. Thanks to the new TravelMate™ 4000E WinDX2™/50 Active Matrix Color notebook from Texas Instruments.

50MHz DX2 processor with coprocessor provides desktop performance in a notebook.



With 256 brilliant, simultaneous colors and a 50MHz 486DX2 processor, this powerhouse doesn't just whisper color, it screams it.

And yet the TravelMate 4000E weighs a mere 6.2 pounds, including battery. This convenient size and weight gives you more performance* than the leading 486 notebooks. And the industry's first 4mm, full-travel keyboard gives you the feel of a desktop.

Of the leading active matrix color notebook manufacturers, only TI offers the desktop performance of a 50MHz DX2 processor.

Active Color Notebook	*Weight (lbs.)*	*486 Processor*	*Speed*	*Coprocessor*
TravelMate 4000E	**6.2**	**DX2**	**50MHz**	**Yes**
Toshiba T4600C	6.9	SL	33MHz	Yes
Compaq LTE Lite 4/33c	6.5	SL	33MHz	Yes
IBM ThinkPad 720C	7.6	SLC2	50MHz	No

Thanks to built-in Windows 3.1 and useful TI utilities, you can power up to Windows in just 15 seconds. And the TravelMate 4000E is Windows NT-compatible. With 4MB of main memory, expandable to 20MB, you're ready for today's and tomorrow's software.

If you work on the go, you'll also go for the rugged 200MB hard disk drive, the high-speed video bus and 1MB of video RAM, as well as the full range of connectivity options -- snap-on modules for Ethernet® LANs, SCSI-compatible devices and an internal 14,400 bps V.32 bis modem with 9,600 bps send/receive fax capability.

For more information about the only 486 notebook family that won five Editor's Choice awards in PC Magazine's August issue, call *1-800-527-3500*.

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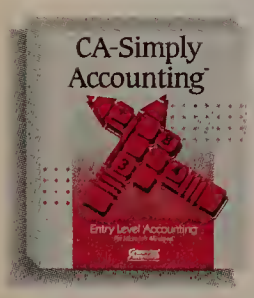
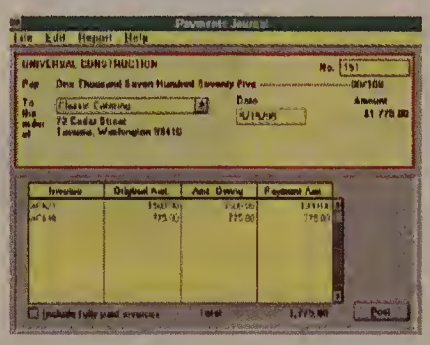
Circle 244 on reader service card

Small Business Genius Reveals Accounting Secret.

Easy To Learn, Easy To Use, Easy To Afford.

When it comes to accounting software, this is Easy Street. It's the friendliest, easiest, most powerful small business accounting software ever developed. With simple instructions, terrific tutorials and friendly, colorful menus, you'll be up and running in minutes. Just click the mouse to write a check, process a bill, prepare an invoice or do your entire payroll.





And it has all the accounting modules your small business needs: General Ledger, Accounts Payable and Receivable, Job Costing, Payroll and even Inventory Control. They're all completely integrated and let you generate all kinds of great-looking reports with the push of a button.

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Circle 51 on reader service card

The ABCs of Theft Prevention

Crime is on the rise. Big news, right? Anyone can tell you that. But you may not realize what a hot ticket your notebook or your palmtop is. Portable computers are stolen easily—and often.

In 1992, $882 million worth of computer equipment was stolen, according to Safeware, a Columbus, Ohio, insurance company specializing in computer coverage. That was a 10 to 12 percent increase over 1991, and the figure was expected to have climbed again in 1993 (though final stats aren't ready), says Safeware CEO David Johnston.

"Notebooks are in high demand, so they retain their value," says Robert Zises, executive director of the Stolen Computer Registry and president of the National Computer Exchange (Nacomex), a used PC brokerage firm in New York. "They're also very easy to steal." According to Zises' estimates, notebook computers accounted for 28 percent of all stolen computer equipment last year—though they represented only about 14 percent of the installed base.

And once stolen, the equipment moves fast. A hot PC changes hands three to five times in the first 24 hours, and another five to eight times in the second 24 hours, says Sergeant James McMahon, supervisor of the San Jose, California, Police Department's High Tech Crime Detail.

"A PC that gets stolen in California can show up in New York the next day," adds Zises. He started the registry in 1990 in response to the growing number of "suspicious" computers that were showing up at Nacomex.

"When we tried to check, we found there was no way to determine if equipment was stolen," says Zises. In New York City alone, a PC stolen in one precinct couldn't be traced in another.

The registry maintains a database of serial numbers for stolen computer equipment, then it checks against the database for the serial numbers of equipment sold on the secondary market or confiscated by police. Approximately 50 insurance companies participate in the registry, as do several law enforcement agencies and computer resellers. Member insurance companies automatically report the serial numbers of stolen equipment belonging to their insurees, but individual PC owners can also report stolen equipment by dialing into the registry's BBS (212/505-7526).

What You Can Do

Given the grim statistics and the lack of a concerted effort to thwart computer theft, it's up to you to protect your investment. It's not difficult, according to McMahon, but surprisingly few PC owners take the simple precautions he recommends.

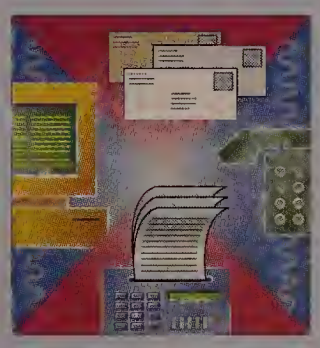
Rule number 1, says McMahon, is to mark your equipment. Every day, police recover lost or stolen equipment but can't return it to the owner because they don't know to whom it belongs. "I end up auctioning off millions of dollars worth of equipment," notes McMahon.

There are a couple different ways to mark your equipment. You can engrave your name or driver's license number on the case, or attach a property ID tag—though the tags are easy to remove. Another option is to include a message in your AUTOEXEC.BAT file that identifies you as the owner and gives contact information.

Along the same lines, a $29 software product called Computer Owner Protection (COP, for short) from IDX Technologies of Setauket, New York (800/645-5404) creates a file on your hard disk with an ID code. As part of the software registration process, the make, model, and serial number of your system and your name, address, and telephone number are stored in a database that IDX maintains. When someone types COP at the DOS prompt, a message pops up that identifies the computer as listed with the International Computer Recovery Center and gives a number to call for information about the owner.

The information is encrypted and stored in a number of places, making it difficult for thieves to erase the files, according to IDX Technologies owner

KEEPING UP



Some things in life are free—well, almost. The success of Computer Associates' giveaway of CA-Simply Money has inspired two smaller firms to follow suit. Central Computer Products (805/524-4700) is offering its Do-It-Yourself Accounting for Windows—a small-business accounting package—for a $9.95 shipping and handling charge. Parsons Technology (800/682-9628) is also getting into the act, offering Tax Mate, a stripped-down version of its tax prep package, for an $8 S&H charge...It's not free, but a new $14.95 CD ROM on the proposed Health Security Act, The Clinton Health Security Plan: What It Costs and What It Means to You, by Allegro New Media (800/424-1992), is worth a look. It includes the full text of the act, plus analysis and commentary by business, health, insurance, and political types. Don't have a CD ROM drive? A scaled-down version is available on floppy disk; there's no expert commentary, but the full text of the health act is included.

By Roberta Furger

MICHELE CLEMENT

Warner Loeb, who says he sends out 16,000 or so fliers each year informing law enforcement agencies about his product.

Keep Out the Snoops

Property identification is an important first step, but it won't protect your confidential information from prying eyes. And, in many cases, high-tech thieves can thwart your ID efforts by reformatting the hard disk. A handful of software security packages are designed to address both these problems, offering password protection, data encryption, and, in some cases, hard disk locking.

DiskLock from Symantec (Symantec took over the product when it purchased Fifth Generation Systems), Security Guardian from Command Software, and Watchdog from Fischer International Systems all require users to enter a password before they can access the hard drive, and prevent users from booting from a floppy to bypass the security features. According to their developers, DiskLock and Watchdog also prevent unauthorized people from reformatting the hard drive.

A new product, also from Fischer International, provides hardware-level data security. SafeBoot ($225 list) uses a SmartDisk to encrypt files and ensure that only authorized users can access your computer. The SmartDisk looks like a standard 3½-inch floppy, but it has its own microprocessor. During installation, the program generates an encryption key, which is stored on the SmartDisk. From then on, you can't boot up without having the SmartDisk installed and typing in the correct password. That may be a hassle for some, but if you're carrying around sensitive information on your notebook, it's worth considering.

Heads Up

But even the toughest software security products won't prevent your notebook from being stolen. McMahon and others say business travelers need to think about where they store their equipment when it's not in use.

"For God's sake, don't leave a notebook in the backseat of a car," stresses McMahon, clearly frustrated by the number of people who don't follow this simple advice. He also cautions against leaving your notebook in your hotel room. When he travels, McMahon stores his notebook in a locked suitcase, which is secured with a cable and lock to a desk or bureau in the room. "It's not going to stop someone who really wants to steal it," says McMahon, "but it will keep honest people honest." Another option is to store your equipment in the hotel safe (although this is less convenient).

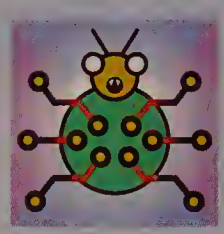
Insurance can also be a smart investment, particularly if you travel frequently. A word of advice, though: Home-owner's insurance policies don't typically cover equipment used for business purposes or losses that occur outside your home. Check with your insurance agent to find out what's covered under your policy.

Safeware and the Computer Insurance Agency specialize in providing insurance for computers, covering everything from theft to power surges. Rates vary, depending on the value of your equipment.

A new program from the Computer Insurance Agency covers loss of equipment on the road. A comprehensive policy for $3000 worth of equipment costs approximately $60 per year.

If, despite your best efforts, your equipment is stolen, report your loss to the police immediately, says McMahon. "A lot of people don't file a report because they think the cops don't care, or because they don't think they can afford an hour or more to fill

BUG WATCH



The Black Screen of Death

Microsoft and Novell report that NetWare users running DOS applications under Windows may experience system crashes—leaving a blank screen, except for a flashing cursor in the upper left-hand corner. Both companies released fixes on their bulletin board services. Users can obtain a copy of Novell's fix, VIPX.386 (Novell's virtual IPX code for Windows), or Microsoft's fix, VTDA.386 (a patch to Windows' virtual timer device), from the Novell NetWire on CompuServe (GO NETWIRE) or from the Microsoft Download Service (modem 206/936-6735 for self-extracting file ww0863.exe), or from the companies directly.

Microsoft
206/637-7098
Novell
800/638-9273

WordPerfect 6.0 for Windows

WordPerfect 6.0 for Windows users may find that fonts get scrambled in documents created in earlier versions of the package. To avoid this, WordPerfect says users should make sure they're using updated printer drivers. Other users report program crashes when running 6.0 for Windows with a 256-color super-VGA driver. To correct the problem, use the WPWin /FL start-up switch. You can add this by editing the properties of the WPWin icon.

WordPerfect Customer Support
800/541-5098, 801/226-8766

Presentations 2.0 and WordPerfect 6.0

WordPerfect acknowledges that lines with arrowheads (such as those used to dimension technical drawings) created in Presentations 2.0 and imported into WordPerfect 6.0 will grow out of proportion to the document. WordPerfect for Windows users can work around this by using OLE to import the line. Users of the DOS version, however, will have to wait for version 2.1 of Presentations.

WordPerfect Customer Support
800/541-5098, 801/226-8766

WinSleuth Gold Plus

Dariana has released Revision 12 to correct WinSleuth Gold Plus's reporting of the use of DMAs and IRQs in the Direct Test screen. The revision also adds a missing right scroll bar to the program's interface. Registered owners of WinSleuth Gold Plus who call to obtain the release will also get a free update to the program's diagnostic testing that allows users to test for hardware conflicts after installation of new programs or devices.

Dariana Inc.
800/892-9950, 714/236-1380

—Sarah Klein

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Sarah Klein is an editorial intern for PC World.

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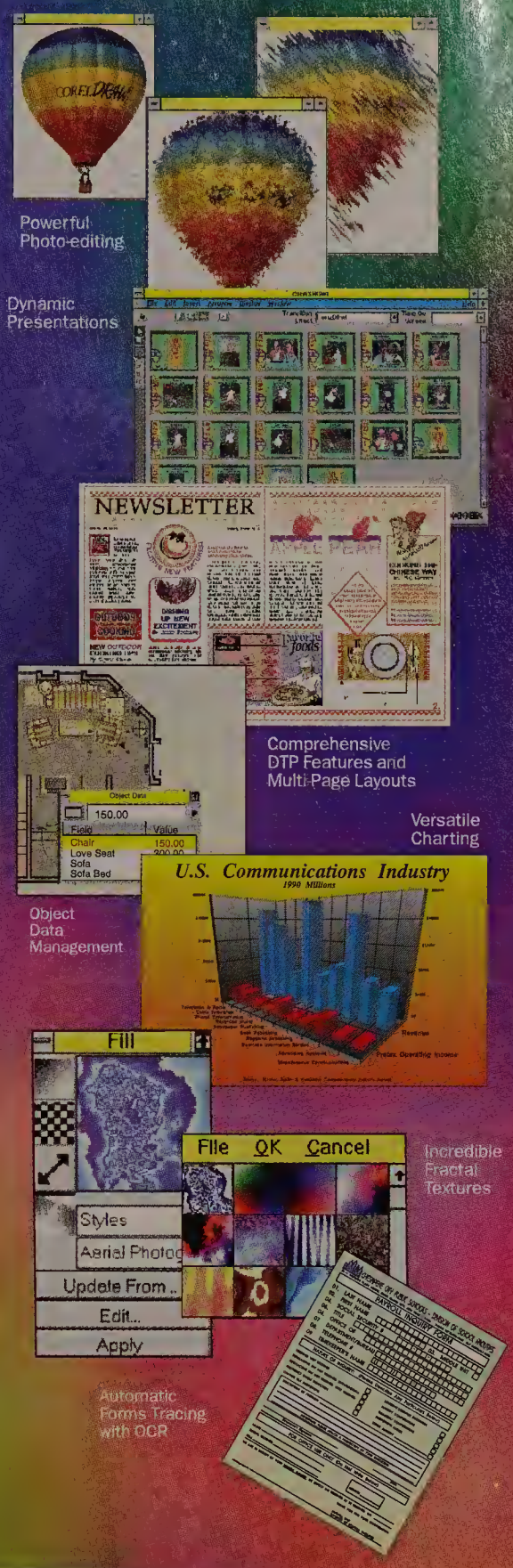

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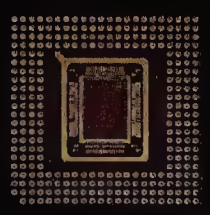

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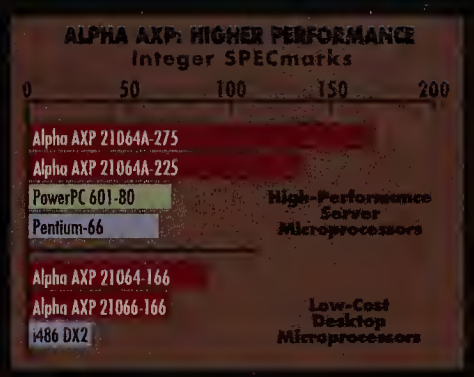

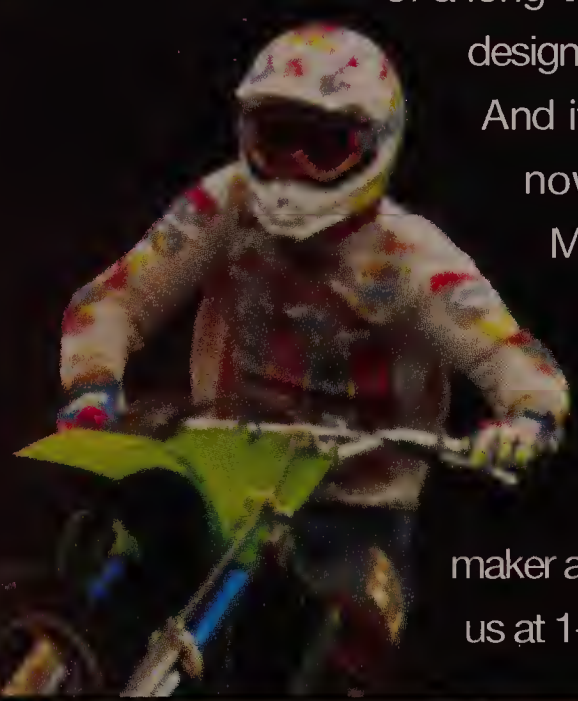

To Work

digital™

out the paperwork," he says. But, he adds, equipment is returned every day to people who take the time to notify the authorities.

Shop Talk

Free Trial or Confidence Game?

I want to warn everybody about a scam I recently fell prey to. I got a call from American Computer Industries in North Hills, California. It offered me six printer ribbons to use for a free 30-day trial. I got the ribbons—three times as many as I needed for a trial—but the one I used jammed my printer. I removed it and called the company for a return merchandise authorization (RMA) number. That's when I started getting the runaround. I talked to three people who seemed delighted to have tricked me into trying their product so they could con me into paying for something I didn't want.

I received an invoice charging me $46.85 for each ribbon and $53.10 for shipping. That's a grand total of $334.20 for ribbons that were supposed to be a free trial. Seven days after mailing the first invoice, American Computer Industries sent a past-due notice informing me that if I didn't pay this outrageous amount within the month, it would file a lawsuit.

Bud Parrett, Killeen, Texas

Editor's note: Besides writing to *Consumer Watch*, Parrett also contacted the Better Business Bureau and the California Attorney General's office. As a result, American Computer Industries issued him an RMA number and stopped billing him. The Better Business Bureau has had other reports of misrepresentation by this company and advises extreme caution when dealing with any unknown company that calls selling office supplies. Instruct employees not to provide details about your office equipment to unknown callers, not to authorize delivery of supplies from unknown companies, and not to accept CODs for goods you didn't order.

Legally, if you receive merchandise you didn't order through the U.S. mail, you can keep it as a free gift. Section 3009 of the Postal Reorganization Act of 1970 makes it illegal to mail unordered merchandise and then demand payment for it. This law doesn't protect you, however, if you accept unordered goods sent via UPS or other private delivery services.

Lost in the Flood

I ordered three computer programs from Mindware in Santa Cruz, California. Since the order totaled more than $100, I was to get a bonus program. Over a three-month period, I called trying to get the complete order. And when I finally received the last of the four programs, it was damaged. I wrote two letters explaining the problem and asking for a refund for the damaged program. I never received a reply to either letter. This week I faxed a copy of my second letter. Still no reply.

Ken Lewis, Alameda, California

Editor's note: We contacted Mindware, a reseller of self-help software, on behalf of Lewis and learned that the company had been forced into Chapter 11 bankruptcy by a natural disaster. In July, Mindware mailed its new catalogs from Wisconsin. The next

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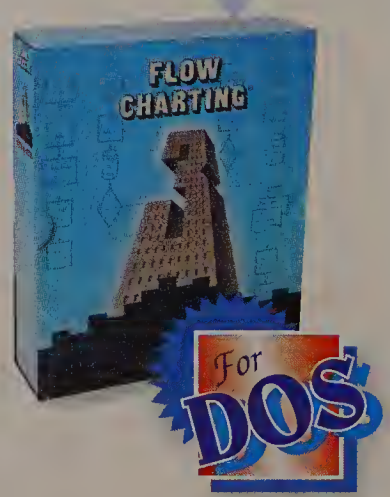

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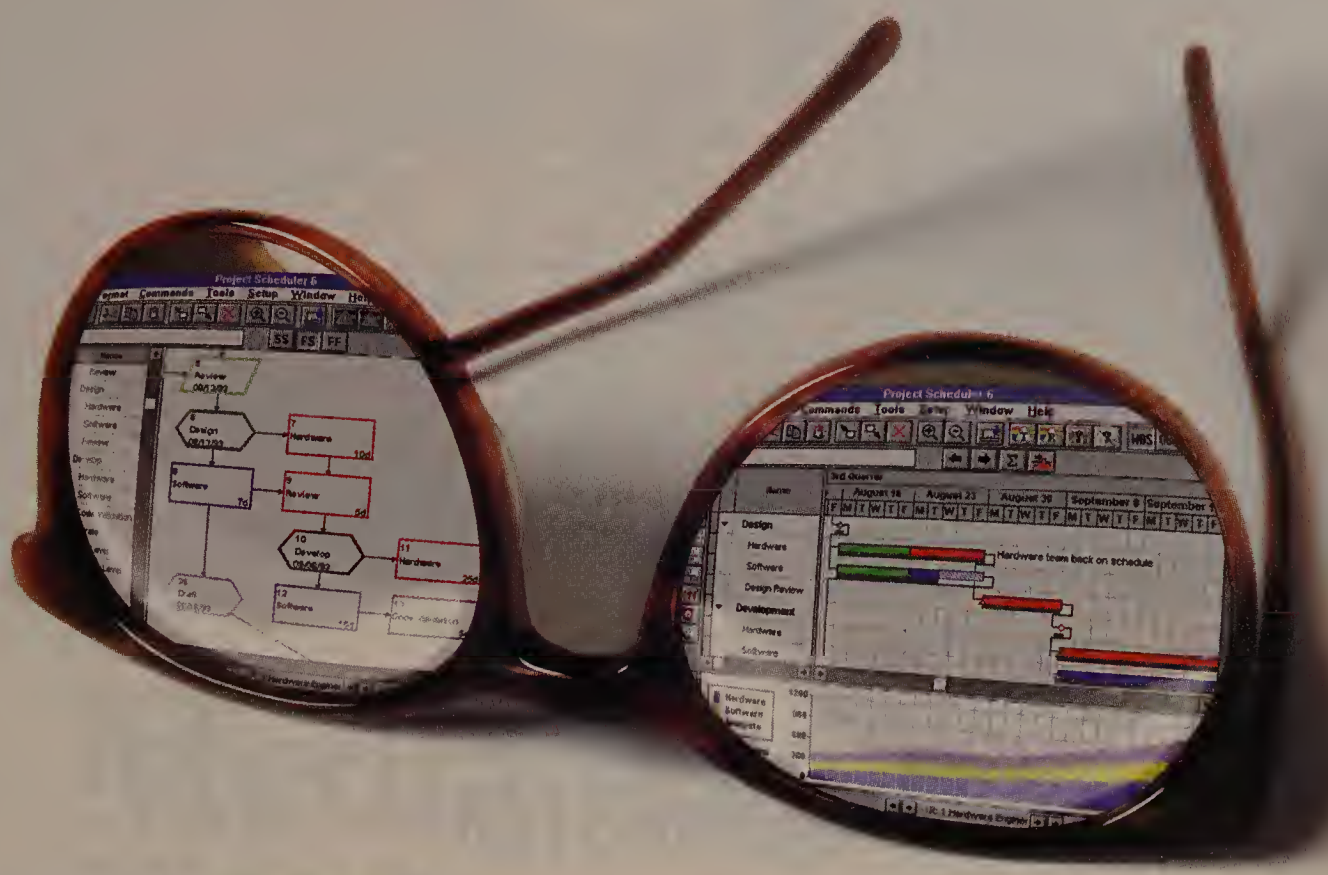

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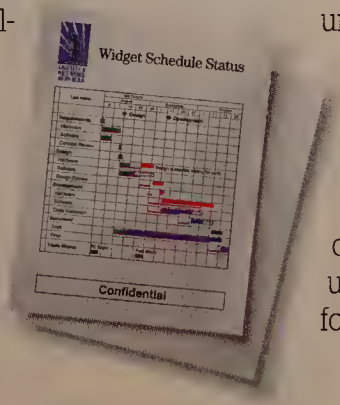

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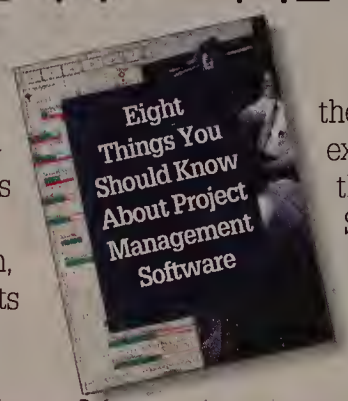

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day, the floods hit and most of the catalogs were lost or destroyed in the flood. Since very few catalogs made it to their destinations, Mindware's revenues nose-dived. Mindware is reorganizing and hopes to emerge from bankruptcy early in 1994. Anyone owed a refund should have received a letter with instructions for contacting the court handling all debt. If you didn't get that letter, call 800/447-0477 and Mindware will send one to you.

Full Disclosure

During a recent business trip, I purchased an Orchid Technology P9000/VLB video board. I had read that video boards with the Weitek processor were among the fastest boards for running Windows.

As a conscientious consumer, I asked the salesperson to let me read the manual before buying because I wanted to be certain that the board would be compatible with my system. The manual said there was a conflict with motherboards using the UMC chipset, but it offered a solution. I knew my board used this chipset, but the manual led me to believe that adjustments made during the installation would correct any incompatibility. Wrong.

After several hours of tweaking DIP switches and modifying my CONFIG.SYS file, the best I could manage was about 10 minutes of operation before my system would hang or I got a General Protection Fault or a parity error.

I called technical support. After I explained the problem, the technician said, "Return the board to the dealer and get your money back." I was flabbergasted. He explained that motherboards with the UMC chipset don't work with the P9000—regardless of the driver. That's not what the manual says.

I live 1500 miles from the dealer and it will charge me a 25 percent restocking fee.

Manufacturers should come clean with known incompatibilities and indicate them on the package. Although I read the manual before I bought the board, I was burned.

Gregory Lee,
Pitt Meadows, British Columbia, Canada

Editor's note: Orchid told us that when the P9000 was released, the adjustment suggested in the manual seemed to be a sure fix. But Orchid later found problems with components and configurations the company hadn't tested. Says Tim Jones, manager of customer services for Orchid: "I agree that manufacturers should come clean with known incompatibilities. We cannot guarantee that our products will work in every system, but we have nothing to gain by keeping this information from the consumer." Jones noted that "Orchid has no control over our dealers' return policies," but added that the company often will contact the dealer directly and explain the circumstances.

In this case, Orchid did contact the dealer, who agreed to take back the board and waive the restocking fee.

Shop Talk *is written and researched by* PC World *assistant editor Christina Wood. Think you've gotten a raw deal—or a great one?* Consumer Watch *wants to hear the details. We'll investigate complaints and publish letters with the broadest interest. See page 12 for contact information.*

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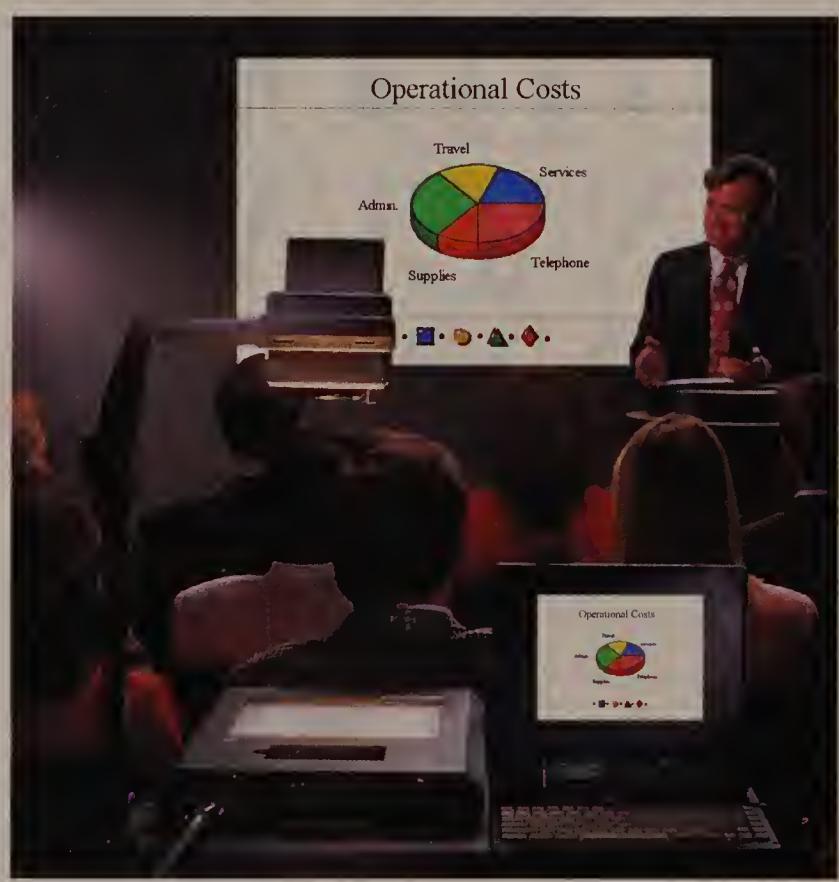

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No More Business as Usual

There's a lot of talk among business and government leaders about downsizing operations and increasing efficiency. But actually achieving those goals is another matter. This month Carlos Solivan, assistant coordinator for Palm Beach County in West Palm Beach, Florida, explains how the Facilities Management division learned to do more with less—and save local taxpayers a million dollars in the process. (Listen up, Al Gore.) —*Ed.*

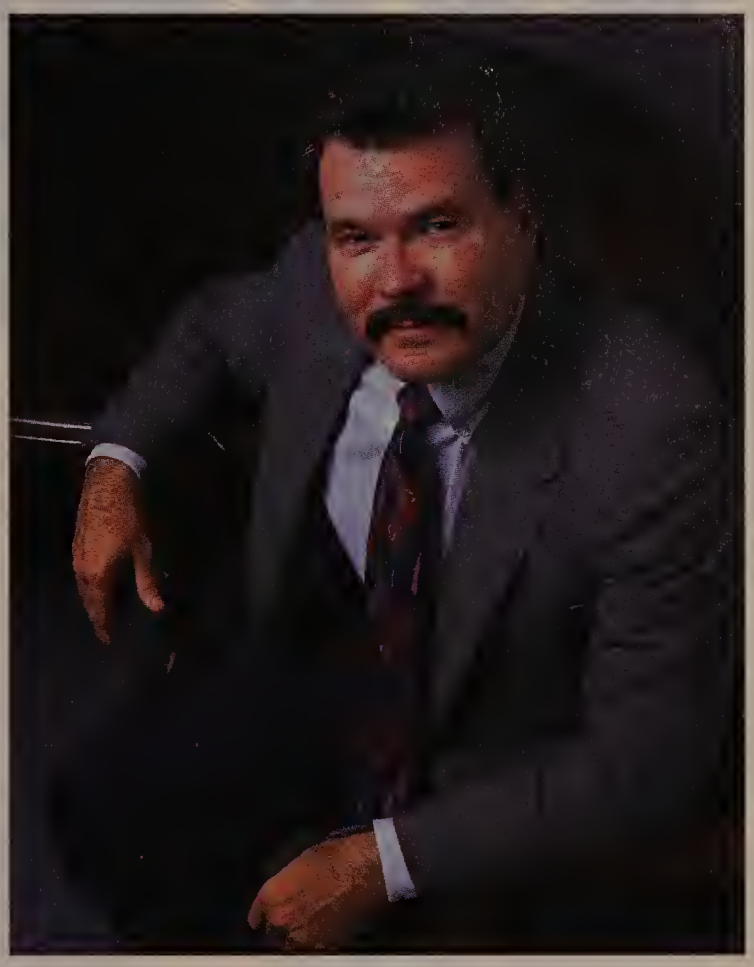
The Right Tool for the Job

"Using quill pens in the age of WordPerfect"—to borrow Vice President Al Gore's phrase—is something government workers are famous for. And my division was no exception. But faced with conflicting pressures to cut costs *and* improve and expand our services, we had no choice but to move into the twentieth century and automate our operations. This was no small task, since many of our field workers had never touched a computer before, but by involving everyone in the project, we overcame employee objections. As a result, we cut costs, improved efficiency, and saved jobs.

The Facilities Management division in West Palm Beach is responsible for the operation and maintenance of more than 500 county-owned buildings, including libraries, courthouses, jails, and offices. Until about three years ago, we had a single centralized location situated in the heart of the county. Our division consisted of 1 manager, 8 supervisors, and 122 maintenance workers who, along with several office and storeroom clerks, repaired and maintained the buildings.

Although most people were satisfied with the quality of our repair work, our response and turnaround times were poor. Every time a hallway needed painting, we received a work order for the job—either over the phone or (more often) through the mail. Sometimes it took us four to six weeks to respond. When we did, as many as 30 workers were dispatched to the site, sometimes driving as much as an hour each way. At the end of the day, each worker typed a work order. A supervisor collected the forms and gave them to a clerk, who then used a calculator to add up the labor and material charges that would be billed to the originator of the work request.

By 1990 our inefficiencies began to catch up with us. The county's population was growing fast. To meet the increasing demands for new schools, libraries, and other buildings, we needed to expand our staff by a third, but because of budget constraints, we were expected to slash our expenses by the same amount over the course of a three-year period.



Carlos Solivan is an assistant coordinator for Palm Beach County, Florida.

SUSAN GREENWORD/GAMMA LIAISON

Dividing and Conquering

In February of 1990 we decided to decentralize, dividing the department into four regional teams to put maintenance workers closer to building sites.

We also decided to get rid of our calculators and automate the entire process. We planned to set up a PC with a computerized maintenance management software (CMMS) system—a specialized database management program designed to track and organize maintenance projects—to replace the manual work-order system. After looking at two dozen CMMS packages, we settled on an $8000 package called GP Mate from GP Solutions of Columbia, Maryland, and installed it on a PC at our main office in West Palm Beach.

Once the single-user system was in place, our plan was to install a network connecting our four offices. By the end of 1990, we had hired managers for each regional office and outfitted each office with a 386 PC and a modem. The PCs were linked via ethernet to the server running NetWare in the central office. Because the CMMS package would automatically track and account for all labor and material charges and help us avoid the errors produced by our manual methods, we were easily able to justify the total system cost of $34,000.

The Buy-In Battle

Installing the PCs was far easier than getting the maintenance workers to accept the new system. Most of them had never touched a computer. Fearing the new system would put them out of work, they met it with antagonism.

The new system wouldn't be effective, however, without the full cooperation of all the workers, so the management team set about to inform workers and involve them in the process. First, we held a general meeting to discuss our plan to improve efficiency. We

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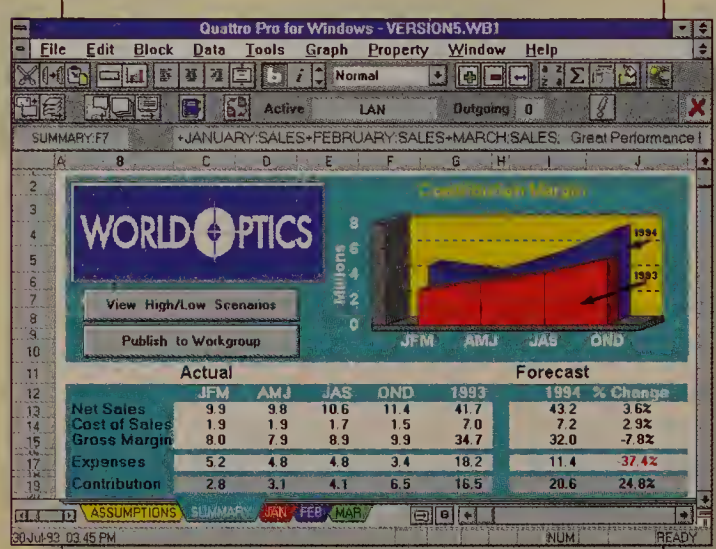

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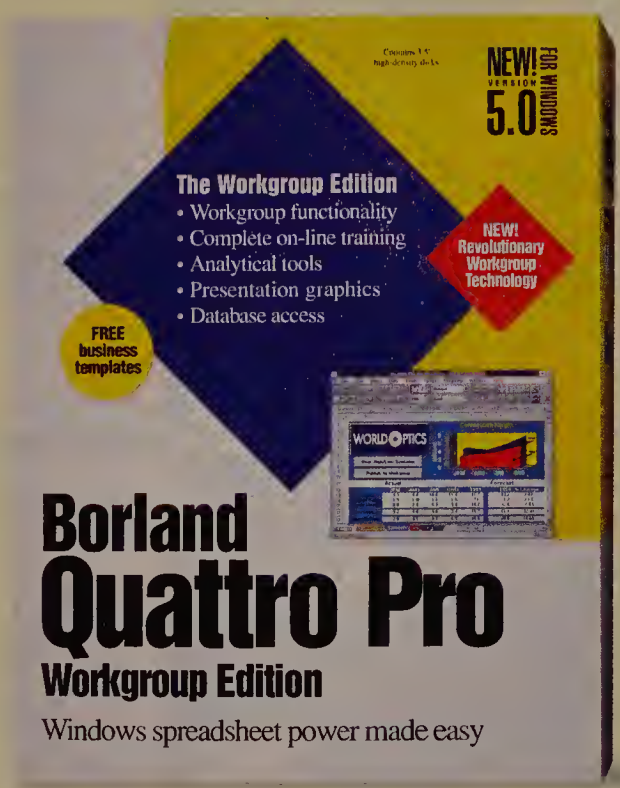

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showed the workers how the new system could eliminate the paperwork they hated. We told them that if we couldn't improve our services, we might lose our jobs to outside competition. Finally, we emphasized that by helping us provide faster service, the computer solution would enable us to serve our customers better and—as a result—help us *keep* our jobs.

Once we'd convinced workers of the benefits, we had to enlist their help. None of them had used computers before, but they became active participants in gathering the data for the databases. Workers in each trade took an inventory of materials and maintenance procedures. This information became the basis for each of the financial, personnel, parts, materials, equipment, and maintenance databases. At the end of each day, the data-gathering teams met to discuss progress. Finally, a clerk entered all the information into the CMMS system.

The new system proved far less paper intensive than the old one. Each worker was given an assignment objective, step-by-step instructions, and dates for assignment completion. On a 3-by-8-inch card, the worker wrote down the work order number, along with hours worked each day for an entire week. At the end of the week, a clerk entered the data into the system. (Soon all workers will wear bar-code scanners on their belts. When they go to a site, they'll scan in the work order number on the card and punch in their hours. Each night the information will be downloaded into the PCs.)

Across-the-Board Improvements

Besides cutting response time and increasing productivity, our new methods have lowered costs and improved processes across the board. We can bill other county agencies in a fraction of the time it took before. We haven't had to hire additional workers, and we've reduced the cost of maintaining the county buildings by 66 cents per square foot—saving over $1 million a year. And because PCs are no longer perceived as a threat but as a tool, some workers have even purchased their own.

Edited by Bronwyn Fryer

If you use PCs to manage people and other resources in a business environment, we want to hear from you (see page 12 for contact information).

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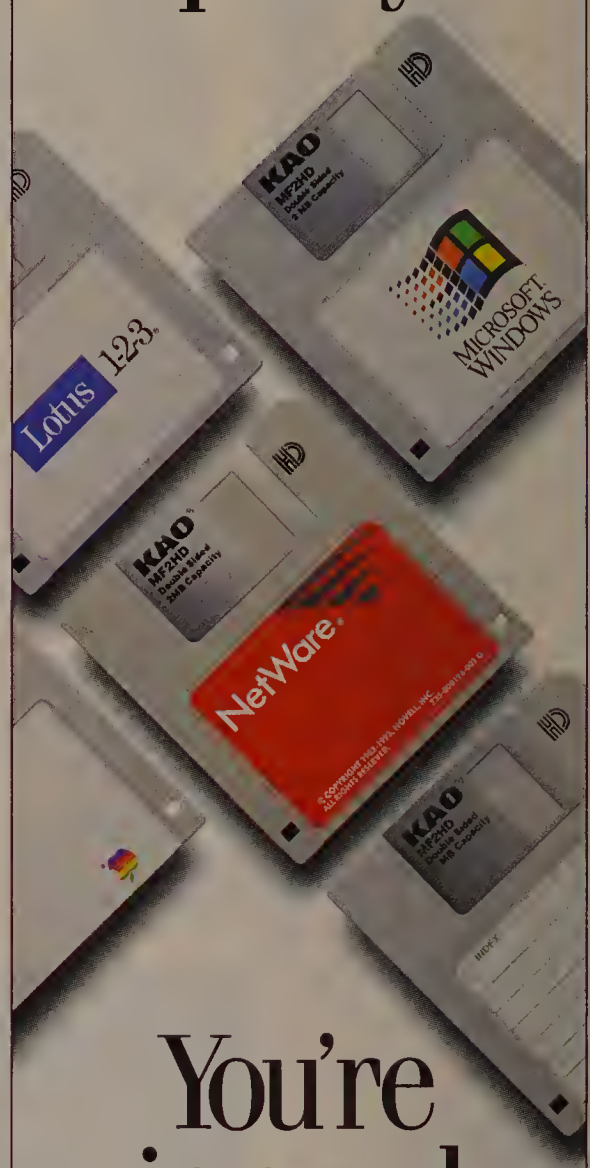

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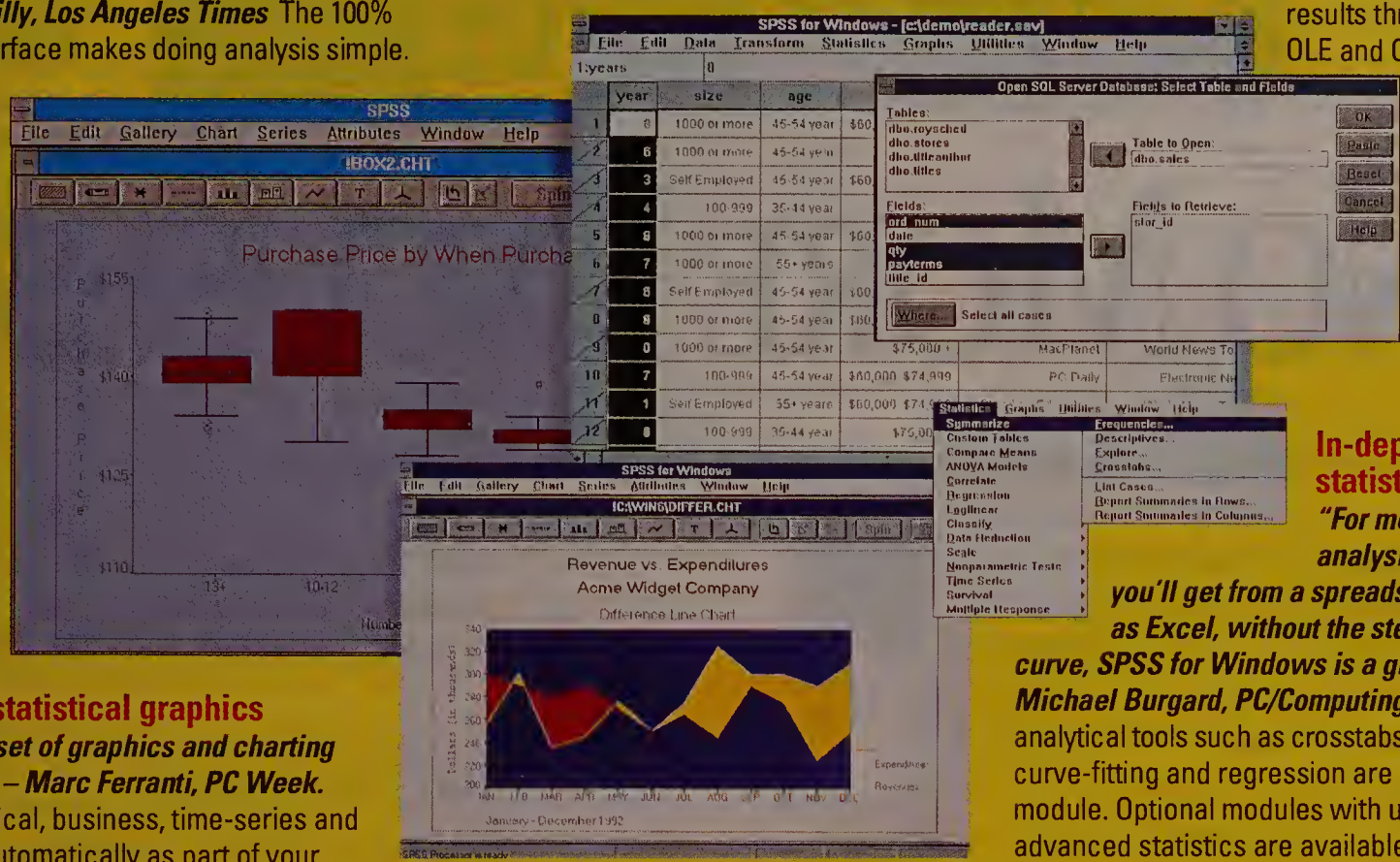

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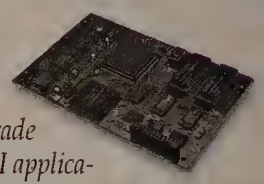

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A Whole Lot of Converging Goin' On

I have seen the future of software... and you've probably already turned your nose up at it.

I'm a member of the Church of the Integrated Desktop. This is a place where the lines between applications have disappeared, where you move from one task to another without interruption or so much as a thought about whether you're processing words, crunching numbers, retrieving corporate secrets, drawing a map, scheduling a meeting, or sending electronic mail. To glom on to to the buzzword of the day, I'm talking about a full-scale desktop convergence.

If you want to see what this will look like, don't buy an expensive suite of Windows apps or trash your Intel machine. Just invest about $99 in one of those "works" packages you've probably never taken seriously before—they provide as clear a vision of the integrated desktop as I've seen. Especially since the new suite and office application sets demand 6MB of RAM and can take more than 60MB of hard disk space, something most portables and many desktops don't have.

What I like about the various works packages is the way they let you choose an opening task—a spreadsheet, for instance—but don't make you stick to the choice. Once you have a worksheet on the screen, it's easy to choose the text editing tool and turn your spreadsheet into a word processing document with a table in the middle.

This is how I believe a desktop should behave: Turn it on and it starts working. It offers a core set of tools that work across applications, and it provides icon bars and tool sets that change dynamically according to the task.

I have to confess this works best on a Macintosh today, where the document (I use the term loosely) you're working on takes center stage, surrounded by the tool palettes you need to complete the task. On the PC side, however, a 21-inch monitor and a well-designed integrated application can make you look at desktop computing in a very different way—which is good, considering what a jumbo monitor is likely to cost. But not to worry—we're talking about the future, and in the future everything always costs less. Remember the words of the Zen master: This, too, shall come within your credit card limit.

Of course, the makers of those big-bucks suites say their products provide integration on the desktop, too. High-tech mysticism like Microsoft's Object Linking and Embedding (OLE 2.0) and Apple's OpenDoc promise greater integration but have only just begun to deliver. The hot feature of OLE, "in-place editing," lets you keep several applications open as you move from one part of a compound document to another. OpenDoc does the same thing, and proponents claim greater ease of use.

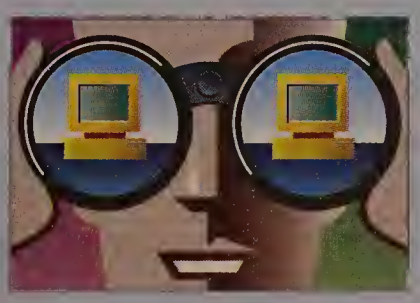
This will mean the end of applications as we know them. Separate applications will become a collection of engines that provide text editing, math, database, messaging, and other functions. Some will become part of the operating system, giving Microsoft even more control over your desktop.

Users will be able to mix and match these engines, although software publishers will probably do everything they can to lock you into a single set. What we think of as applications will be user interfaces built around these engines, perhaps with WordPerfect and Lotus providing integration tools rather than the core engines themselves. Tomorrow's garage-shop programmers will create new engines or combine familiar ones in new and interesting ways.

This new way of creating applications will be the renaissance of the desktop software industry, but it will come at the expense of applications as most of us think of them today—and of vendors who are unable or too slow to change.

Contributing Editor David Coursey edits P.C. Letter. *He can be reached on PC World Online (see page 12 for contact information).*

LOOKING AHEAD



While I still can't find a reason to be wild about the Apple Newton and the Tandy/Casio Zoomer, some of the best applications are being written for these devices. The principal problem with them: Expensive memory cards limit the number of applications most users can afford . . . Microsoft faces early problems, mostly in trying to deliver on its connectivity promises, but I predict it will emerge from 1994 the PDA operating system vendor of choice—especially if users move quickly to Chicago (the operating system) . . . The easiest way to regulate the convergence of cable TV, phone, and PC technologies in your living room is also one of the simplest: Prevent the carriers from controlling the programming, and license the program channels, much as broadcasters are licensed. This will reduce the likelihood of creating a new class of robber barons . . . Watch for multiple upgrades of Borland Office 2.0 in the coming months as WordPerfect and Borland try to make WordPerfect 6.0 and Quattro Pro work together. The question: When will the suite be stable enough to buy?

By David Coursey

MICHELE CLEMENT

FOUR MILLION PEOPLE MAKE THAT FOUR

FRANK IS A COMPUTER BUFF. IN FACT, HE'S THE UNOFFICIAL cc:MAIL ADMINISTRATOR – WHICH TAKES HIM ALL OF 45 MINUTES A WEEK.

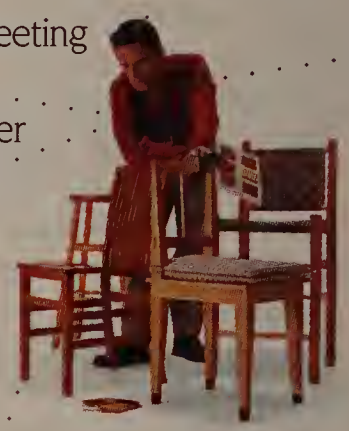
E-mail is not just for the big guys anymore.

More and more workgroups and small companies are taking the step to e-mail. Because now there's the Lotus® cc:Mail® Group Pack™ with everything you need to get ten employees up and running on the power of cc:Mail.

cc:Mail lets you send messages and files electronically – to colleagues, clients, suppliers – speeding your processes and giving you an invaluable competitive tool. cc:Mail opens lines of communication, keeps everyone in the loop and eliminates all the running around.

Lotus cc:Mail, recently rated the #1 e-mail system by *Infoworld*† and *Software Digest*,†† offers benefits no other e-mail can match. Like a unique, rules-based architecture which lets you automatically manage, filter, even reroute your mail. And Lotus Organizer™ 1.1, the top-rated personal information manager, is integrated into cc:Mail Group Pack so you can schedule meetings quickly and easily. Just enter a suggested time for a meeting and Organizer will consult your co-workers' schedules and tell you whether they're available. And it does this without revealing personal schedules. Plus, cc:Mail has a built-in spell checker, flexible search options, an intuitive user interface and dozens of features that make it easy to use.

BRIAN, IN QUALITY CONTROL, CREATES A WEEKLY STATUS REPORT IN LOTUS 1-2-3 AND USES cc:MAIL TO CIRCULATE IT THROUGH THE COMPANY.



BILL IN PRODUCTION USES cc:MAIL TO COMMUNICATE WITH HIS OUTSIDE SUPPLIERS.

JOAN, THE V.P. OF FINANCE, COUNTS ON THE GROUP SCHEDULING FEATURE TO PULL MEETINGS TOGETHER EASILY.

SALLY, THE DESIGNER, HAS CUSTOMIZED HER MAILBOX TO PRIORITIZE HER INCOMING MAIL AUTOMATICALLY.

In Canada call **1-800-GO-LOTUS**. †Infoworld, October 18, 1993. ††Among all electronic mail systems tested. Software Digest, Ratings Report, Vol. 10, #10, 10/93. Software Digest is a registered trademark of and Group Pack are trademarks of Lotus Development Corporation. cc:Mail is a registered

CURRENTLY USE cc:MAIL. MILLION AND TEN.

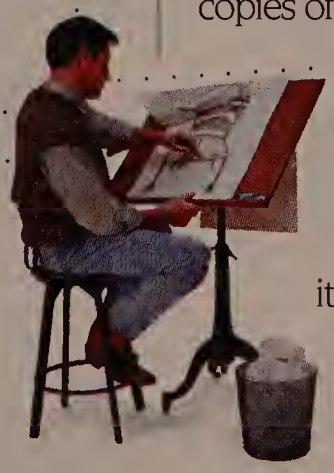
In fact, cc:Mail Group Pack is so easy to install, use and maintain that you don't need a dedicated LAN manager. And cc:Mail works across virtually all major hardware platforms, networks and operating systems. So it's easy to see why publications like *BYTE*, *LAN Magazine* and *Windows Magazine* have showered cc:Mail with awards. And why 4.2 million people in all kinds of companies depend on cc:Mail every day.

This standard is now available for businesses, or workgroups, like yours. For about half of what these products would cost separately, you get a cc:Mail Group Pack which includes: cc:Mail for Windows 2.0, cc:Mail for DOS, Organizer 1.1 and licenses for 10 users. All for just $845 (SRP). (To add more users or to purchase additional copies of cc:Mail and/or Organizer see your Local Authorized Reseller.) At this price, it is not a question of whether or not your company needs e-mail. The question is: how quickly can you get Lotus cc:Mail Group Pack. Fortunately, it is available right now. Just visit your Lotus Authorized Reseller or call 1-800-448-2500.

TED IS THE PRESIDENT OF A SMALL FURNITURE COMPANY. HE PURCHASED THE cc:MAIL GROUP PACK TO MAKE HIS COMPANY MORE COMPETITIVE.

JIM, THE SUPPORT/DELIVERY GUY, USES ORGANIZER TO PLAN HIS DAY.

RHONDA IN SALES RECEIVES ORDERS FROM HER REGULAR CUSTOMERS VIA cc:MAIL.



JEFF, THE ART DIRECTOR, IS NO COMPUTER GENIUS. BUT HE GOT UP AND RUNNING ON cc:MAIL WITH NO TRAINING.

SYLVIA IN ACCOUNTING LIKES EVERYTHING ABOUT cc:MAIL.

Lotus
Working Together®

NSTL, Inc., a McGraw-Hill Company. ©1993 Lotus Development Corporation, 55 Cambridge Parkway, Cambridge, MA 02142. All rights reserved. Lotus, and Working Together are registered trademarks and Organizer trademark of cc:Mail Inc., a wholly-owned subsidiary of Lotus Development Corporation.

ARE YOU BEING USED TO TEST SOFTWARE?

Bugs are crawling unchecked through recent software releases. Here's how you can protect yourself and keep these pests off your computer.

Edited by Russell Glitman

It was like a war. Man versus machine. There was no cooperation at all," laments Jack White, a technical writing consultant and novelist in Baltimore, who recently upgraded to WordPerfect 6.0 for Windows. "The vendors are using *us* to test their software."

The public outcry about bugs following the recent releases of PackRat 5.0, CorelDraw 4.0, Microsoft DOS 6.0, WordPerfect 6.0, and other software packages begs the question: Are vendors using customers to test their software?

Jeff Tarter, editor of the PC industry newsletter *Soft-letter*, doesn't think so. "The economics of releasing buggy software makes no sense. It's economic suicide." A software company can spend a fortune to repair the damage caused by shipping a buggy release. "Development costs for testing are infinitesimal compared to the cost of shipping patches and handling technical support," says Tarter. But shipping a buggy program and immediately responding with a fix seems to be a trend. So what is inspiring software developers to commit this economic hari-kari?

Competition Makes Them Do It

According to Dave LeFevre, product manager for WordPerfect's Windows marketing team, "Competition has gotten a lot heftier and development cycles have sped up." A software developer used to come out with a release every few years, but everyone is moving to a 12- or 18-month upgrade cycle. "If you're the market leader, you want to remain the technology leader," says Jack Leach, president of Polaris Software, which makes the personal information manager PackRat. PackRat's 5.0 upgrade met with screams of horror from users—it was crawling with bugs.

Everyone I talked to agrees that shipping a squeaky clean Windows program is virtually impossible. "Any software product released has bugs in it," observes Tony Audino, director of marketing for MS-DOS 6.0. Bill Cullen, manager of quality assurance for Corel, agrees. "The combinations of hardware and software are infinite. We can't test everything." So it isn't a question of whether software is buggy. It's a matter of how buggy is too buggy to release. When the marketing people—rather than the quality control specialists—decide what's acceptable, it spells trouble for the user.

Polaris's Leach admits that PackRat 5.0 was shipped before it was ready, but the company had announced the product months earlier. Once a program is announced, the vendor's revenue stream dries up—no one will buy an old version if a new one is on the way.

Corel has fallen into a similar trap by announcing a 12-month upgrade schedule for CorelDraw. "Most industries revolve around a 12-month cycle," says Corel president and CEO Dr. Michael Cowpland, who argues that there will always be some problems with products. "Take the car industry, for instance. Every year they come out with a new model. And it doesn't really matter if it's 18 or 24 months, the problems are still the same," Cowpland says.

Bug Priorities

Corel's Cullen, however, believes that a "yearly cycle is good as long as it's a target, not a brick wall. When we approach a release date," Cullen explains, "a committee reviews the outstanding bugs. Everyone makes their pitch as to how important the bugs are and what will happen if we release with that bug."

Ed Waldorph owns a telecommunications company in San Francisco and participated in the beta test of CorelDraw 4.0. He saw three releases of the beta, and all were too buggy to test. "The final beta had serious problems, and many of them remained in the shipping copy," he says. "The beta test team believes that 4.0 was released too early because of an arbitrary decision to release on a schedule."

News Monitor

CABLE TV GOES ONLINE: How would you like a modem that runs 1000 times faster than the one you currently use? Intel and General Instruments have announced plans to develop high-speed modems that work with cable TV networks—that's right, the same cable TV you get in your home. Home computing is the fastest growing segment of the PC market, and the Intel-GI program is designed to take advantage of the faster data transfer speeds offered by cable's broadband technology.

A high-resolution image that now takes 15 minutes to download over a conventional modem would be accessible in seconds via a cable modem, says General Instruments chair Daniel Akerson. Field trials are scheduled to start this year in selected locations. Cable operators Comcast and Viacom International and online service providers America Online and Prodigy will participate. CompuServe and Continental Cablevision will test a similar program in Exeter, New Hampshire.

WIRELESS BONANZA: Sometime in the not-too-distant future you can expect a greater variety of wireless services, thanks to the recent Federal Communications Commission (FCC) decision to allocate a large chunk of the radio frequency spectrum to personal communications services (PCS). This 160 MHz of the 1.85-GHz-to-2.2-GHz band was previously used by public agencies, railroads, and utility companies. PCS providers will likely offer ad-

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ILLUSTRATIONS: LEFT, JEFF BERLIN; ABOVE, TERRY ALLEN

Top of the News

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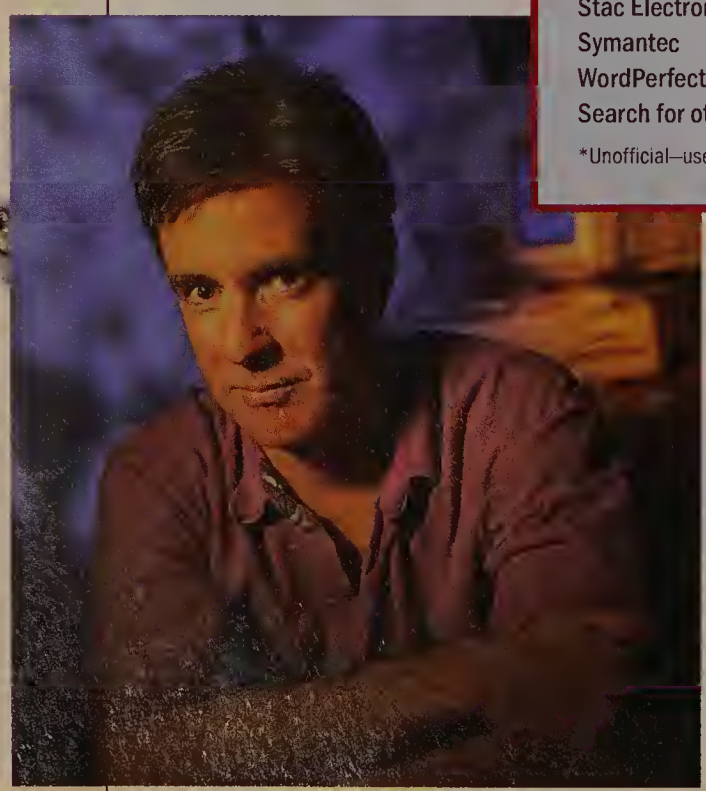
When DOS 6.0 and WordPerfect 6.0 for Windows hit the streets, users made their complaints known. But Microsoft put DOS 6.0 through a grueling beta test and insists it has no major bugs. And WordPerfect's LeFevre says, "We don't feel it's buggy." Users don't agree. The forums for these programs on CompuServe are swarming with confused customers.

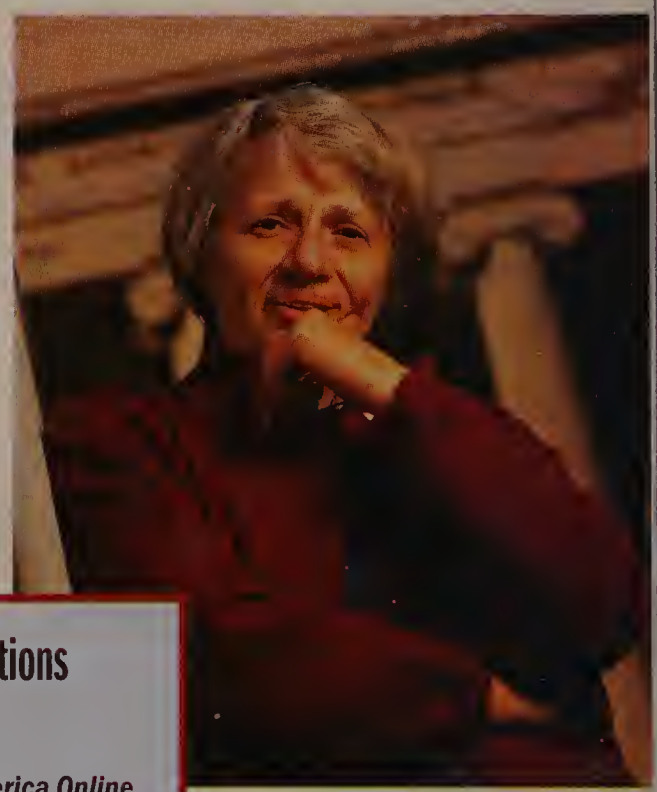
Aleta Clayton, a grandmother and criminal defense lawyer in Washington, D.C., says, "Microsoft advertised DOS 6.0 as something any grandmother could deal with. It's true —if it works. You just follow the menus. But there isn't a grandmother I know who understands the concept of compression." While other grandmothers and the Gray Panthers might dispute Clayton's claim, Microsoft has gotten enough negative feedback that it continues to test the shipping version. Audino says, "We couldn't find any killer bugs. But the customers don't care. They felt there was a problem." To alleviate frustrations caused by user error, Microsoft released DOS 6.2, which provides additional safety features.

MAN VS. MACHINE was how Jack White felt doing battle to upgrade to WordPerfect 6.0.



Future Infestations?

The competitive pressures that lead vendors to hasten software to market aren't going to go away. Does that mean the problem of infested software will get worse? Most say no. "This cost us a lot of money," laments Polaris's Leach. Lotus spokesperson Peter Cohen says, "We have learned a lesson: You don't want to ship software till it's ready. That damages your reputation with customers."



FALSE ADVERTISING: Aleta Clayton disputes Microsoft's claim that grandmothers can do DOS.

Peer Review: What Users Tell Users About Applications

Here are the keywords that will get you to online forums about vendors.

Vendor	*CompuServe*	*GEnie*	*America Online*
Adobe	ADOBE	DTP*	
Aldus	ALDUS	DTP*	ALDUS
Autodesk	ASOFT ACAD	CADD	
Borland Int"l	BORLAND	BORLAND	
Central Point Software	CPSDOS CPSWIN		CPS
ChipSoft	WINAPB PCVENB	CHIPSOFT	
Claris	WINCLARIS		CLARIS
Computer Associates Int'l	CAI		
Corel	COREL		
Delrina	DELRINA		
Hayes Microcomputer	HAYFORUM	HAYES	
IBM	IBM	IBMPC*	
Lotus	LOTUS		
Microsoft	MICROSOFT	MICROSOFT	MICROSOFT
Peachtree	WINAPD PCVENF		PEACHTREE
Polaris Software	WINAPA POLARIS		
Software Publishing	SPC		SPC
Spinnaker	SPINNAKER		
Stac Electronics	STACKER		STAC
Symantec	SYMANTEC		SYMANTEC
WordPerfect	WPFILES WPUSERS*	WP	WORDPERFECT
Search for other vendors	INDEX	INDEX	SERVICES

*Unofficial—user supported.

Call the Exterminator

How can you keep bugs out of your computer? Don't buy a new program without first listening to the marketplace. Go online and monitor what people are saying in the software forums. Does the program need a flea bath? And since all software has a few bugs, find out how responsibly a vendor handles problems. Does it have a reputation for responding quickly with a fix?

Read reviews. But if the article you're reading appeared at the same time as the software, the reviewer was probably looking at a prerelease copy. Most reviewers don't complain about bugs in beta software, because most bugs are expected to be fixed before the program ships.

If you don't want to wait for the reviews or you want to take advantage of early-bird specials, take precautions. Don't move mission-critical work into a brand-new program immediately. If you buy an upgrade, don't delete the old version: Create a directory for the upgrade and slowly move your work over. If you're responsible for buying software for a work group, buy one copy first and see how that goes.

Use your consumer leverage by refusing to buy software that's buggy. If the marketplace demands quality software, vendors will be forced to supply it.

—Christina Wood

KATHRYN LAMBERT

Push-Button Connections

TEST DRIVE Relay/PC Gold 6.0 for Windows is a reincarnation of MicroCourier, the attractive but hard-to-use communications software from Microcom. Relay Technology purchased and clothed the package with an interface that conforms to Windows conventions, yet retains the pizzazz of the original MicroCourier. For instance, a File menu replaces the computer dialing directory, there are now a toolbox and dialog boxes, and you can specify your favorite editor. Better yet, the program remembers where you placed screen elements.

My favorite part of Relay/PC Gold was and will forever remain the pop-up keyboard that lets you zap characters to online service menus by pointing and clicking them. For those with knuckles maimed by E-mail overload, the thought of pressing another key can be downright distressing at times. The keyboard is now conveniently resizable. Hotspots let you click words or letters on screen and shoot them back to the online service for rapid-fire interaction.

Another time-saver is the Operator, which helps you set up entries for online services and BBSes. It will even supply the local phone number and the applicable communications settings, as well as add an icon for the service to Relay/PC's screen. For some services, such as CompuServe, it will create a log-on script for you.

A rotating button-cube, which looks like a Rubik's Cube and hovers in the corner of the terminal screen, can be outfitted with up to a hundred buttons that will do everything from type passwords to whiz you to favorite online forums. Although a learning script is provided, getting one's buttons to work can demand the aptitude of a rocket scientist at times. The host mode similarly requires script finagling in order to get it to do things like ask for a password when it answers the phone.

GIMMICKS ASIDE, Relay Technology's Relay/PC Gold for Windows offers a powerful rotating button cube.

My biggest quibble with the prerelease version I used is that it doesn't permit you to see or change the modem-dialing, initialization, and answer strings. You must install the program for your brand of modem and hope that it knows what it's doing (in the case of my portable fax-modem, it did not). The terminal emulation list is adequate, however; Relay/PC supports both DEC and IBM terminals.

On the whole, Relay/PC for Windows is a capably designed program that's a lot of fun to use.

—Judy Heim

Relay/PC Gold 6.0 for Windows

WINDOWS **Communications software that strives to make the Windows world less harrowing.**

Key Features: Pop-up keyboard • Button cube • Improved interface

Pricing: $399

Availability: Immediate

Relay Technology, Inc., 800/795-8674, 703/506-0500, 703/506-0510 (fax)

Reader service no. 840

TERRY ALLEN

News Monitor

(continued from page 51)

vanced fax, data, and paging communications on 120 MHz of the spectrum, with another 40 MHz for unlicensed uses, such as wireless communications within an office building. "It's going to be a while before PCS is available as a service," says industry analyst Craig J. Mathias of the Farpoint Group in Ashland, Massachusetts. "The rules are not 100 percent set, but it does mean that faster wireless LANs will be available in the future" due to the increased bandwidth, he says.

PHONES OF THE FUTURE: If you thought your car phone made life easier, check out what you may soon have in your living room—a "screen phone" that includes a small LCD of 4 to 16 lines for data, a fax-modem, a processor, and flash memory. With it, you'll be able to bank and shop by phone, browse electronic white pages, hook up caller ID service with a contact-manager database, and manage E-mail and voice mail. Apple, Phillips, US Order, and Online Resources have developed their own screen phones and are running market trials with banks. Some participants include Bank of Boston in Massachusetts, Barnett Bank in Florida, and NationsBank in North Carolina. The banks typically charge $8 to $15 per month for banking services and lease of the phone.

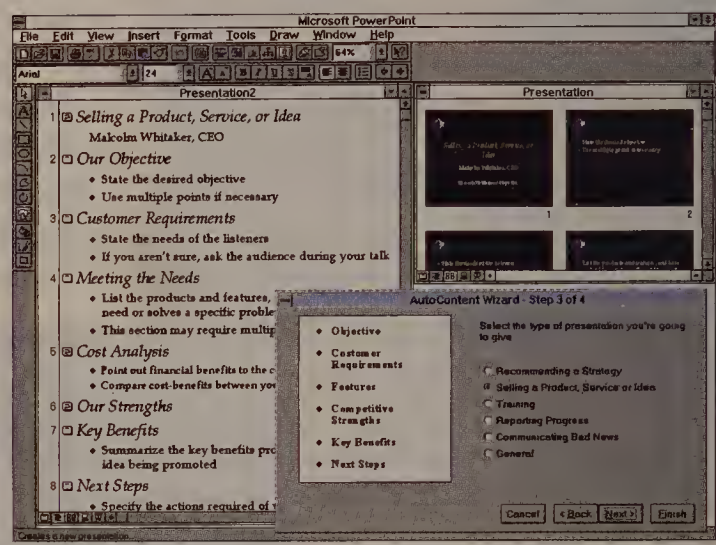
OFFICE IN THE SKY: Thanks to some design projects under way at McDonnell Douglas, tomorrow's airplanes

(continued on page 55)

Power on the Podium

TEST DRIVE Microsoft PowerPoint 4.0's greater ease of use, enhanced features, and tighter integration with Microsoft's Excel 5.0 and Word for Windows 6.0 make this presentation graphics package more competitive than ever with top rivals Freelance Graphics for Windows and Harvard Graphics for Windows.

For most presenters, the hardest task in producing a presentation is developing the content: deciding what to say and how to structure it. To help you jump-start a presentation, PowerPoint offers two new Wizards (interactive guides) that assemble a custom presentation after prompting you to fill in a few blanks and select choices from lists. These and other ease-of-use improvements speed you through the presentation creation process, to help overcome the second hardest task in producing a presentation: getting it done at the last minute.



MICROSOFT POWERPOINT 4.0 includes an AutoContent Wizard that automatically creates a content outline.

Working with a prerelease version of PowerPoint 4.0, I used the new AutoContent Wizard to create an outline for a presentation. The Wizard automatically included sample titles (such as "Our Objective") and bulleted lists. I similarly used the new Pick A Look Wizard to walk through the steps of selecting the proper format for my slides, handouts, and notes. While most presentation programs do a fine job of turning an existing outline into colorful slides, screen shows, and handouts, PowerPoint 4.0 is now the best choice for novices or pros who want more help in creating the content as well as the look of their next presentation.

Other ease-of-use improvements include more floating and customizable tool bars and ToolTips (pop-up descriptions) for specific tasks, right mouse-button shortcuts, a vertical scroll bar to move to a specific slide, an interactive status bar, and new buttons to quickly add slides or change a layout or template. PowerPoint 4.0 also offers presentation design tips and Cue Cards (similar to Harvard Graphics' on-screen Advisor),

Microsoft PowerPoint 4.0 for Windows

WINDOWS **Business presentations get easier with new automated features.**

Key Features: Wizards and Cue Cards • Supports multiple documents • New graph and organization chart features • 1100 clip art images • Supports OLE 2.0 • Tighter integration with Microsoft's Excel and Word for Windows

Pricing: $495

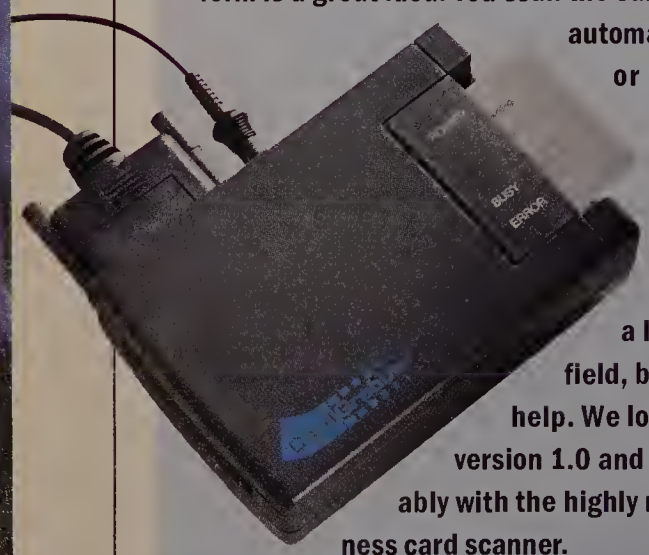
Availability: Immediate

Microsoft Corp., 800/426-9400, 206/882-8080

Reader service no. 841

Another Business Card Scanner Choice:

The notion of transforming a stack of business cards into electronic form is a great idea. You scan the cards, and the appropriate data automatically loads into a database or contact manager. Unfortunately, in our experience these products still require human intervention.



CardGrabber ($399) from Pacific Crest Technologies is a late entry into this intriguing field, but it, too, needs some human help. We looked at a prerelease copy of version 1.0 and found that it compares favorably with the highly rated CypherScan 1000 business card scanner.

The key difference between CardGrabber and its competitors is the Walkman-size scanner that's included with the software. A nifty portable device, it connects to your PC or notebook via the parallel port—far simpler than the add-in card installations required by most other business card scanners. But while the scanner's small size means you can plop it in your briefcase and use it on the road, it also means you can't scan much besides business cards.

If you are interested in automating the thankless task of hand-typing business card data, you should investigate the CardGrabber and CypherScan products. But don't think all your problems are over. By the time you install one of the programs, get used to their eccentricities, edit misplaced data, export the revised entries to your favorite database, and check that the entries are correct in their new home, you might not have saved a whole lot of time. Pacific Crest Technologies, 800/870-3391, 714/261-6444, 714/261-6468 (fax). Reader service no. 842

JOHN GREENLEIGH

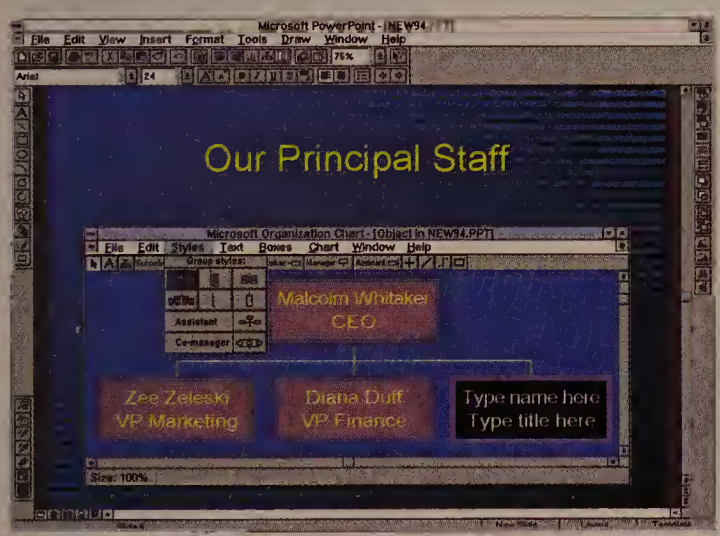
which provide step-by-step instructions for tasks such as adding sound or video clips to a screen show.

Additional PowerPoint 4.0 enhancements include support for multiple documents with drag-and-drop capabilities between presentations and other applications; improved graphing, including a Chart Wizard and new chart and graph types (just like those in Microsoft Excel); a larger 1100-image clip-art gallery; and more flexible color controls, which make it easier, for example, to recolor scanned images or clip art to match a color scheme on a slide. PowerPoint also has a spiffy new organization chart module (a scaled-down version of Org Plus from Banner Blue Software), which provides a gallery of ready-to-go org chart styles that you can easily edit and pop into your presentation.

PowerPoint 4.0 sports better multimedia controls than its predecessor does, thanks to the bundled Microsoft Media Player. However, PowerPoint 4.0's multimedia features still aren't as impressive as the ones provided by Asymetrix Compel 1.0A or Micrografx Charisma 4.0, which both offer more media management tools, file compatibility, and sample multimedia clips. Unfortunately, PowerPoint doesn't include a single sample multimedia file.

Aside from PowerPoint 4.0's improved ease of use, the most compelling reason to choose this presentation package over its competitors is its compatibility with Microsoft's Excel 5.0 and Word 6.0. All three programs now share consistent interfaces, tool bars, and other features. PowerPoint 4.0's full support for OLE 2.0 and tighter integration with Excel and Word make it easier than ever to share data and switch between these products. For example, using OLE 2.0 visual editing, you can insert a table in PowerPoint and then edit it using Word's more powerful table-making features—without having to leave PowerPoint. You can click PowerPoint's Report It button to launch Word 6.0 automatically and create a word processing document from a PowerPoint outline, or conversely click Word's Present It button to launch PowerPoint and create a presentation from a Word outline.

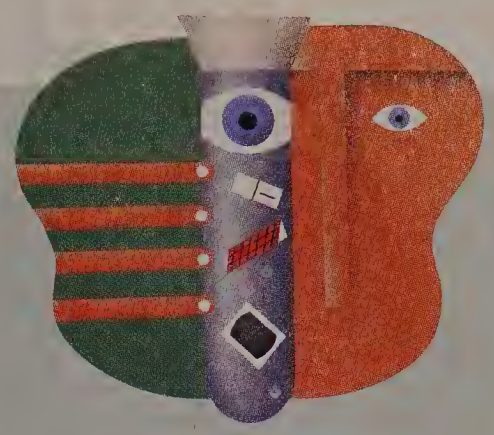
CHANGING A LAYOUT IS EASY thanks to PowerPoint's visual gallery of different slide designs.



POWERPOINT'S ORGANIZATION CHART module automates the creation and editing of org charts.

This strong degree of integration should make the Microsoft Office 4.2 suite, which includes all three packages, irresistible to corporate buyers and individual users who want to standardize on a single software solution. But even if you don't use Microsoft Word or Excel, PowerPoint 4.0's ease of use and improved and enhanced features make it as good a choice as any for an all-around presentation package—especially for first-time presenters who want an easy, painless path to the podium.

—Richard Jantz



News Monitor

(continued from page 53)

could boast new on-board conveniences for owners of portable computers. In the planes of the near future, you may find armrests with data ports, individual AC power outlets for your portable PC, and even an "office in the sky," a galley-size room with a desk, PC, printer, fax, and phone for common use. The office-in-the-sky project has been under design for about a year at McDonnell Douglas's aircraft division in Long Beach, California. While the office in the sky is still a conceptual design, major carriers such as American Airlines and Delta Air Lines are looking at the idea. We can expect many of these improvements on airplanes within five years, according to McDonnell Douglas industrial-design director Billie Hendrixson. Phones and plugs could show up sooner, she says.

600-DPI PRINTERS FOR $700: A year after 300-dpi printer prices broke the $800 mark, industry analysts expect 600-dpi printer prices to do the same. This summer, Windows users will find GDI printers sporting 600-dpi resolution for under $750. Destiny Technology has developed a new version of its WinStyler print controller and accompanying software for GDI printers. (GDI printers previously supported only 300 dpi.) In another first, the new WinStyler technology allows a GDI printer to work with both PCs and Macs.

Edited by Randy Ross

Contributors: Jeff Bertolucci and Laurianne McLaughlin

TERRY ALLEN

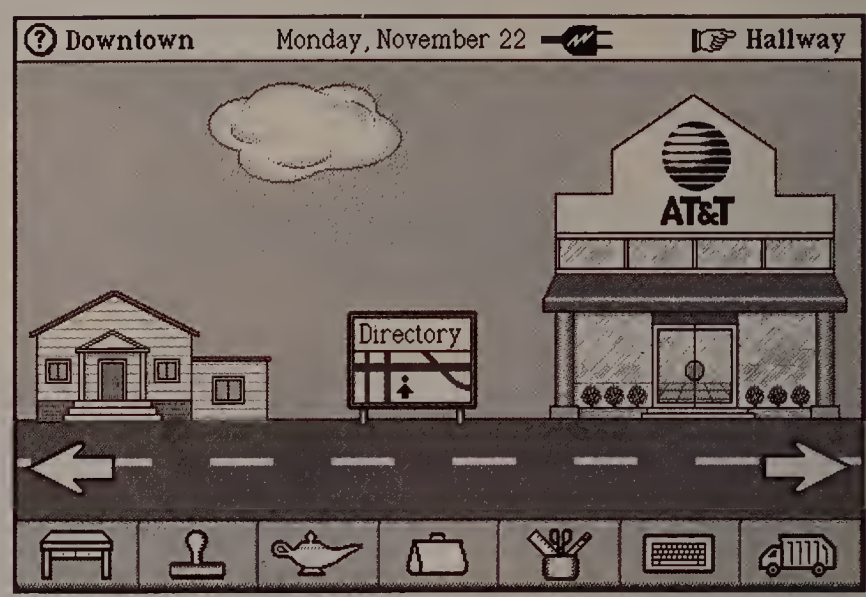
Let Your Agent Do the Walking

Conducting business requires more than data manipulation, more than massaging the collection of 1s and 0s that make up spreadsheets and word processor documents. Business revolves around the transaction of goods and services, and that has traditionally required communication with people. In fact, most things we do, both inside and outside of corporate life, are done in person. And a lot of those activities—tasks such as tracking down the best sale price on a car, organizing a meeting, and making a dinner reservation at a popular restaurant—are just plain mundane.

There has to be a better way, and soon General Magic, a start-up based in Mountain View, California, will offer a software package that will help conduct your business and personal transactions so you can shop at CompUSA or Macy's, for instance, without leaving your office or home. This software is based on *agents*, programs generated by one computer that tell another computer how to do a task. Designed to run on desktops and on a new class of portable communications and computing devices that will emerge this spring for under $1500, the software provides a "virtual environment" in which business and multimedia communications are conducted.

General Magic's product consists of two components: a user interface and operating system, Magic Cap, and the communications application and development tools, Telescript, necessary to build the services to make this economic and communications model possible. In essence, this software provides individuals the on-ramp to and the vehicles that will run on the information superhighway.

The Magic Cap interface presents a familiar world. After all, this is a product designed for the generation raised on the Walkman and the PC. Magic Cap's initial screen is an office with a desk; from there you can enter a hallway with doors to rooms where you keep important information; or you can open the Downtown screen to shop and interact with others who work and live in what General Magic calls "the Telescript illusion."



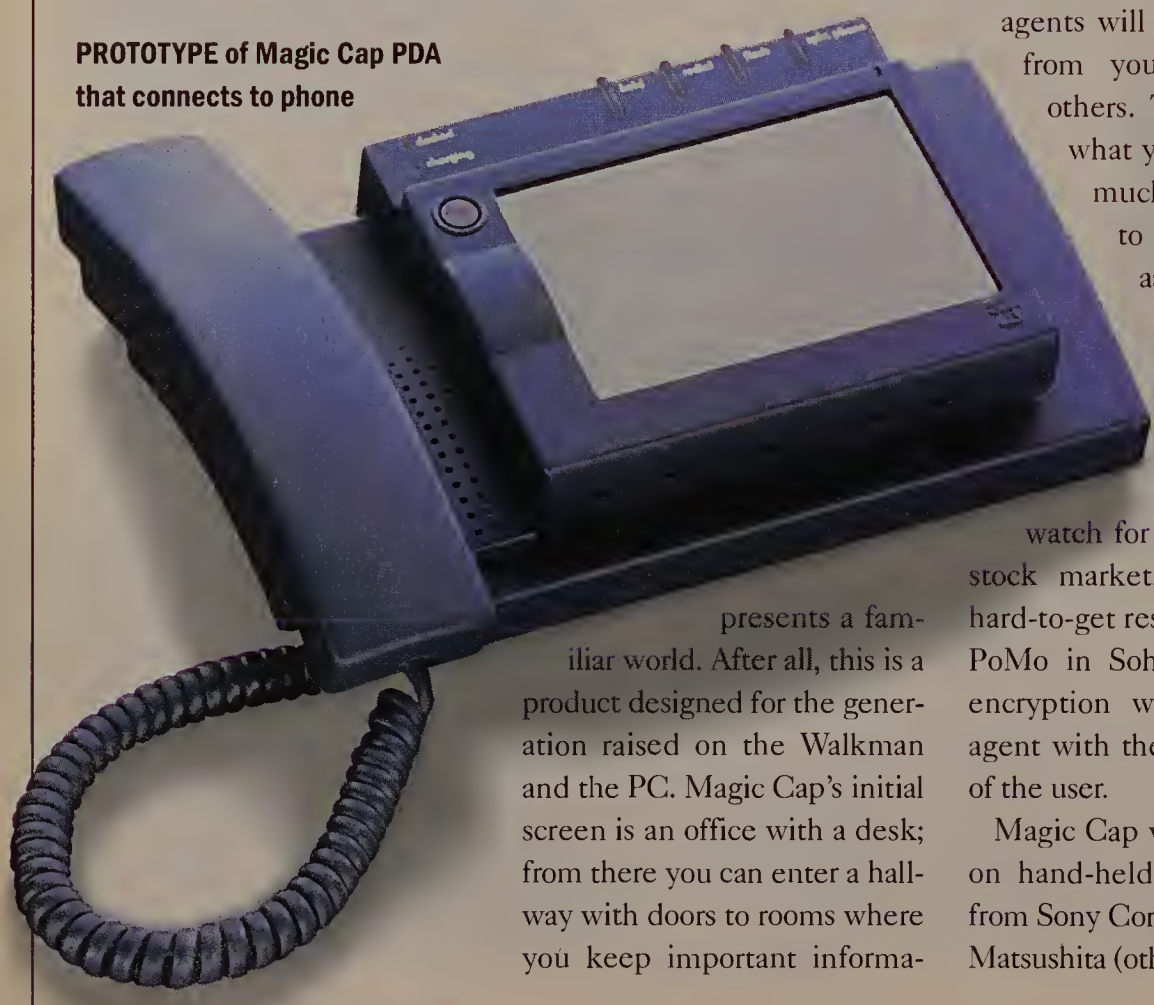
VIRTUAL SHOPPING DOWNTOWN lets Magic Cap users browse Main Street to find information, products, and services. Larger companies will build stores, and local businesses will probably share mall space.

After using an early version of the software, I believe the company has made it almost as easy to use agents as to give a waiter your order. General Magic's agents will be able to roam from your computer to others. They will know what you like and how much you're willing to spend. Acting as your surrogate, they can find the best buy on a Plymouth painted in your favorite color, watch for a bargain in the stock market, or make that hard-to-get reservation at Café PoMo in Soho. For security, encryption will brand every agent with the digital identity of the user.

Magic Cap will initially ship on hand-held communicators from Sony Corporation, Philips, Matsushita (otherwise known as Panasonic), and Motorola. Windows, Macintosh, and UNIX versions are also planned. The software provides a convenient and, perhaps at first glance, overly cute interface for managing agents.

Telescript, the network programming scheme, lets programmers wrap graphical objects representing agents in addresses and send them off to do their bidding. The first network where Telescript will be installed is AT&T's PersonalLink global E-mail system. Wireless connections, from SkyTel and through various cellular and packet radio networks, will also enable users to tap into PersonalLink.

Information vendors and service providers, from McDonald's home delivery to grocers, local restaurants, and florists, will be able to set up shop Downtown. For example, you might receive a message that McDonald's would like to make its delivery menu available to you. Tapping the Yes button would cause a McDonald's restaurant image to appear on your



PROTOTYPE of Magic Cap PDA that connects to phone

JOHN GREENLEIGH

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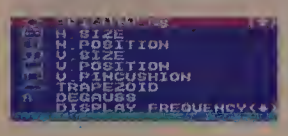
Introducing the ViewSonic 17G — the first in our "Graphics" line of monitors. It's unique! It's powerful! And it's affordable!

This unbeatable monitor features the OnView™ control system, an innovative technology that displays the status of each adjustment and function on the screen. Yes, OnView does make it **very** easy to adjust controls with precise accuracy. Two of the "hottest" controls are: ViewMeter™, which shows the current refresh rate and scanning frequency of the monitor, and ViewMatch™, that adjusts screen colors to closely match printer output.

And it's "green"! Powering down to under five watts when inactive, the ViewSonic 17G supports the EPA's Energy Star program, and is compliant with MPR-II standards for low radiation.

If that isn't enough, the ViewSonic 17G has a special ARAG™ anti-reflection coating, Invar shadow mask and a specially-designed dynamic beam focus gun which provides a sharp, crisp screen image.

This feature-rich 17-inch monitor beats the competition — and the suggested retail price is only $999!



OnView™ Menu

ViewMatch™

ViewMeter™

COMPARITIVE CHART

	ViewSonic 17G	NEC 5FGe	NEC 5FGp
Screen Size	17"	17"	17"
Dot Pitch (mm)	0.28	0.28	0.28
Maximum Resolution	1280 x 1024	1024 x 768	1280 x 1024
Maximum Refresh Rate (Hz) Non-Interlaced	160	90	90
OnView Control	Yes	No	No
Color Matching	Yes	No	Yes
Power Saving	Yes	No	Yes
Non-Glare Screen	Yes	Additional Cost	Yes
Price	$999	$1,155	$1,455

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Image courtesy of AutoDesk Image Development Lab.

Circle 218 on reader service card

Continued from page 56

Downtown screen the next time you log on to AT&T's Telescript network. Henceforth, when you want to eat you'll be able to place your order at the virtual McDonald's on your screen.

General Magic opted to avoid the debate over handwriting recognition in the first version of Magic Cap. Instead, the software relies on pick lists and check boxes, although it does offer an on-screen keyboard on which you can tap out messages. Fortunately, data entry is sped by fields that anticipate what might be entered—writing the letters *en* results in the complete word *engineer*, for example. Magic Cap can also translate acronyms into English, so it's possible to abbreviate input substantially.

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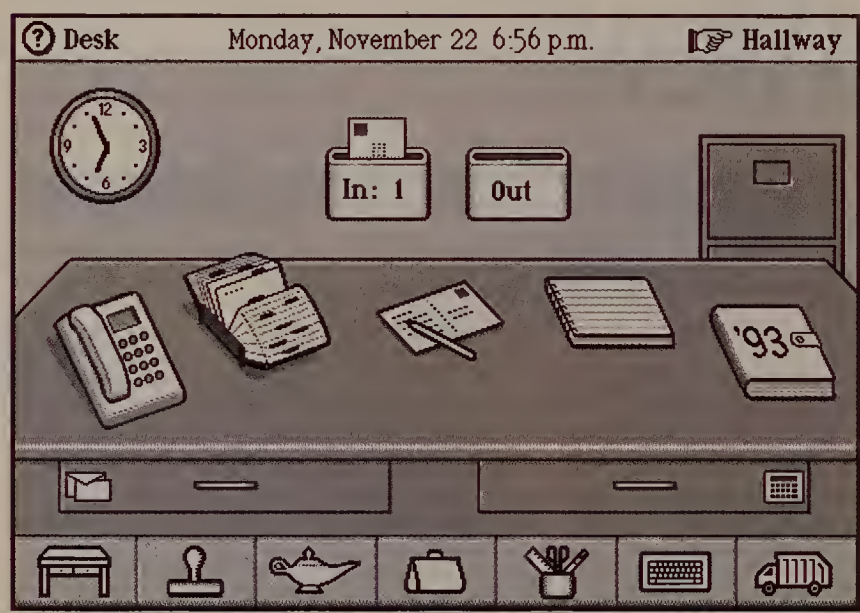

AT THE CENTER OF MAGIC CAP is your desk. The telephone, Rolodex, postcard, notepad, and date book represent applications, and the in- and out-boxes represent network connections.

You'll be able to share your desktop information with the new hand-held devices through Magic Bus, a high-speed serial port on communicators due in late 1994. Before leaving the office, a user will be able to synchronize the contents of his or her desktop address book with data from portables.

Magic Cap is even more intriguing and fun. When you want to send a message, a postcard pops up that also acts as a smart envelope, containing information about how the network should handle the message. When it arrives at its destination, it will install your name, address, phone number, and network address in the recipient's address book automatically (if their preferences are set to allow these updates). Magic Cap includes a drawer of stamps embedded with address format templates and routing information to enable messages to travel over AT&T's PersonalLink, as well as via Internet to CompuServe, SkyTel's pager network, and all major network services.

These stamps can contain an agent. Here's how it works: Say it's your mother's birthday and you want to send flowers. Just tug open the Occasions drawer in the Magic Cap filing cabinet and select the dancing bear stamp (it actually dances), which you picked up on screen from the FTD florist's building downtown. The stamp contains instructions to send a bouquet to the recipient of any note to which the stamp is attached.

When the birthday note to your mom hits the network, the agent in the FTD stamp takes the address book information for you and your mom and heads off to the FTD service residing on the AT&T network. It has a budget of $27.95 and your credit card number, which it uses to place the order for the delivery, along with a card signed by you (the agent grabbed an image of your signature from your personal preferences on the network).

General Magic has two key hurdles to overcome if its product is to succeed in changing the foundation of the economy and the way people communicate and transact business. The company's greatest challenge will be to build gateways that allow Telescript agents to travel outside the illusion, or that allow a LAN or online service to extend the Telescript illusion. For now, only PersonalLink supports transmission of agents. Second, businesses have to sign up and offer the services subscribers will want to use in their virtual downtowns.

Still, General Magic's allure is powerful. For businesses, it offers a very low-cost way to distribute products and target customers. For users, it brings the power to be in more than one place at the same time.

—Mitch Ratcliffe

Compton's New Media

Will Compton's quash multimedia development? Compton's NewMedia, maker of the popular Compton's Interactive Encyclopedia and other multimedia CD ROM titles, wants CD ROM developers to pay royalties or sign a distribution agreement with the company. Compton's claims it invented the multimedia database search system used in many of today's CD ROMs to access text, animation, audio, and video data.

In lieu of a distribution agreement, Compton's is requesting 1 to 3 percent of gross revenues from all CD ROM developers whose products infringe on its patent. Companies affected could include Microsoft, maker of Encarta, Cinemania, and other multimedia CD ROMs. However, many industry pundits doubt Compton's has the clout to squeeze money from its competitors. "The patent is too broad to stand uncontested. I think you'll see either a class-action suit, or Microsoft will jump in to contest it," says Dataquest analyst Bruce Ryon in San Jose, California.

GORDON STUDER

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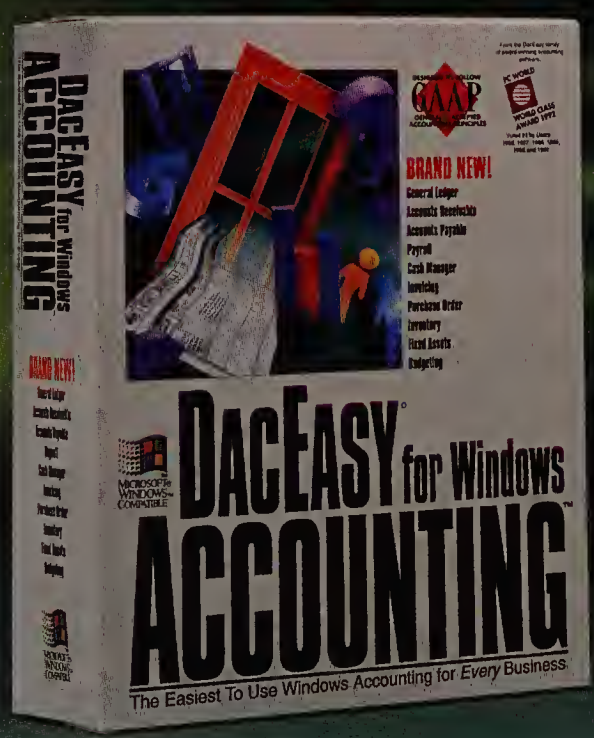

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There seems to be a lot of software that claims to be easy. But nothing stacks up to new DacEasy Accounting for Windows. Its incredibly simple interface lets you access practically any accounting function with the click of a mouse. And the paper look-a-like screens are familiar and straightforward. From tracking your inventory, to making invoices, purchase orders or just writing checks, DacEasy Accounting for Windows does it in seconds. Accounting just doesn't get easier than this. In fact, when reviewed by *PC World* against Peachtree for Windows 2.0, Microsoft Profit and BestBooks, the DacEasy interface was chosen as the easiest-to-use! Plus, it includes a powerful payroll system free! And best of all, if you call now, you can get DacEasy Accounting for Windows with Payroll for just $99.95 - that's 30% off the suggested retail price. When it comes to affordable Windows Accounting, only one is *really* the easiest – DacEasy.

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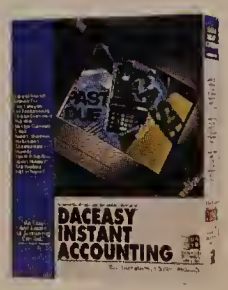

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Circle 94 on reader service card

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20 years.

100,000 men.

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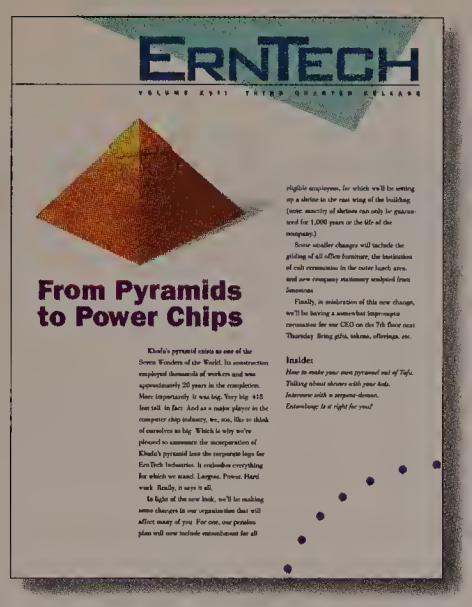
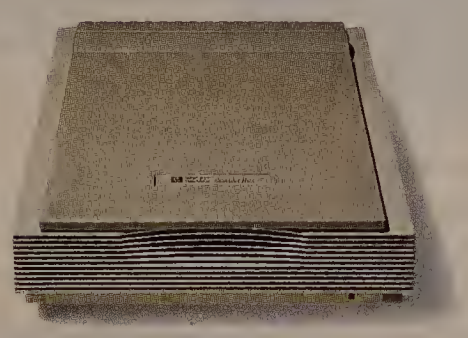
It's that simple. A click, a pass, an image—ready to be saved or incorporated into any document. With the added efficiency of HP DeskScan software, the HP ScanJet IIcx captures images in seconds. And with a TWAIN interface, you'll never have to leave your document to get them.



One click.

One pass.

One scanner.



But simplicity is just part of the story. The HP ScanJet IIcx provides 256 levels of gray, 24-bit color, and 1600-dpi enhanced resolution (400-dpi optical) for scans that are always detailed, always accurate. HP's AccuPage 2.0 technology aids third-party OCR software in recognizing hard-to-read text, thereby speeding up text scans. And Aldus™ PhotoStyler™ SE software allows you to edit scanned images without the need for additional software. Available as options are an automatic document feeder and our new transparency adapter.

With all this, it's easy to see why we're the number one PC scanner. So call now at 1-800-SCANJET, Ext. 7802† for more information or for the name of your local authorized HP dealer.

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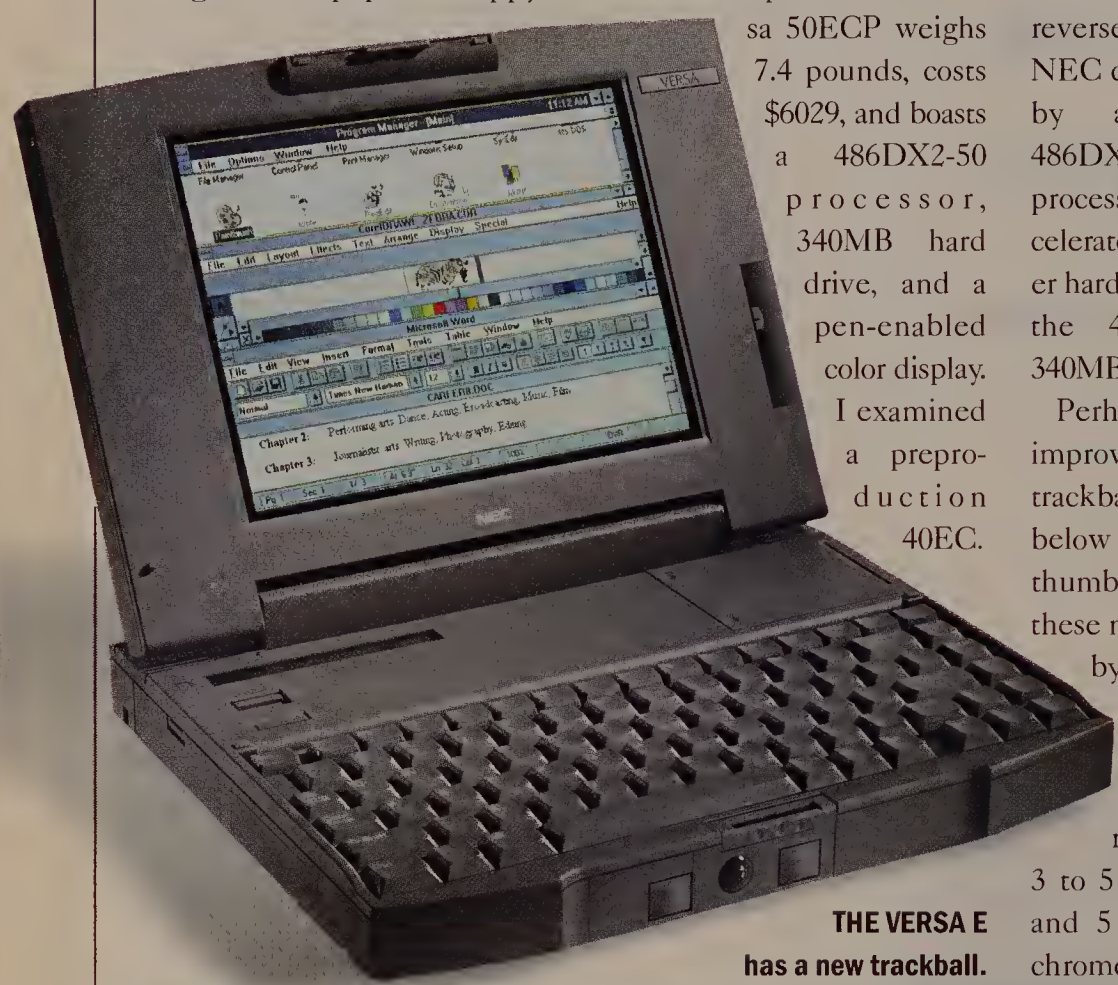
PE 12363

Better Screen, CPU Highlight New Versa

TEST DRIVE

NEC has packed its latest line of Versa notebooks with features that make the systems more powerful, more portable, and better for presentations. Like their predecessors, these units use a modular design, with pop-out floppy drives, hard drives, and screens.

The Versa E Series line starts at $2899 for the 6.2-pound monochrome Versa 40E with an Intel 486DX2-40 processor and a 120MB hard drive. The entry-level active-matrix color model, the 6.9-pound 40EC, costs $4299. The top-of-the-line Versa 50ECP weighs 7.4 pounds, costs $6029, and boasts a 486DX2-50 processor, 340MB hard drive, and a pen-enabled color display. I examined a preproduction 40EC.



THE VERSA E has a new trackball.

The new active-matrix color screen impressed me: It is noticeably brighter than the original Versa display, thanks to increased backlighting. This feature makes an already top-notch presentation machine even better. Displays on these units, like those on the first Versas, can be reversed to face an audience. NEC cranked up performance by adding SL-enhanced 486DX2-40 and 486DX2-50 processors and a new video accelerator. NEC also added larger hard drives, up to 250MB on the 40-MHz models and 340MB on the 50-MHz models.

Perhaps the biggest design improvement is the integrated trackball, located on the front below the keyboard, within a thumb's reach. NEC made these notebooks more portable by improving several other components. A new NiMH battery and enhanced power management boost battery life to 3 to 5 hours on color models and 5 to 7 hours on monochrome, NEC claims. An optional second battery slides into the floppy drive bay to double that. NEC also introduced a 1.1-pound AC adapter, half the weight of its predecessor.

UltraLite Versa owners can purchase a $1999 E Series upgrade, which includes the new chassis, a 486DX2-50 processor, and a video accelerator. Pop in your original hard drive, battery, floppy drive, and display, and you're all set.

—Laurianne McLaughlin

NEC Versa E Series Notebooks

These Versas have more processing power and brighter active-matrix color screens.

Key Features: SL-enhanced 486DX2 40- and 50-MHz processors • New integrated trackball • Outstanding upgrade capabilities

Pricing: $2899 to $6029

Availability: Immediate

NEC Technologies
508/264-8000

Reader service no. 835

First Amendment Issues:

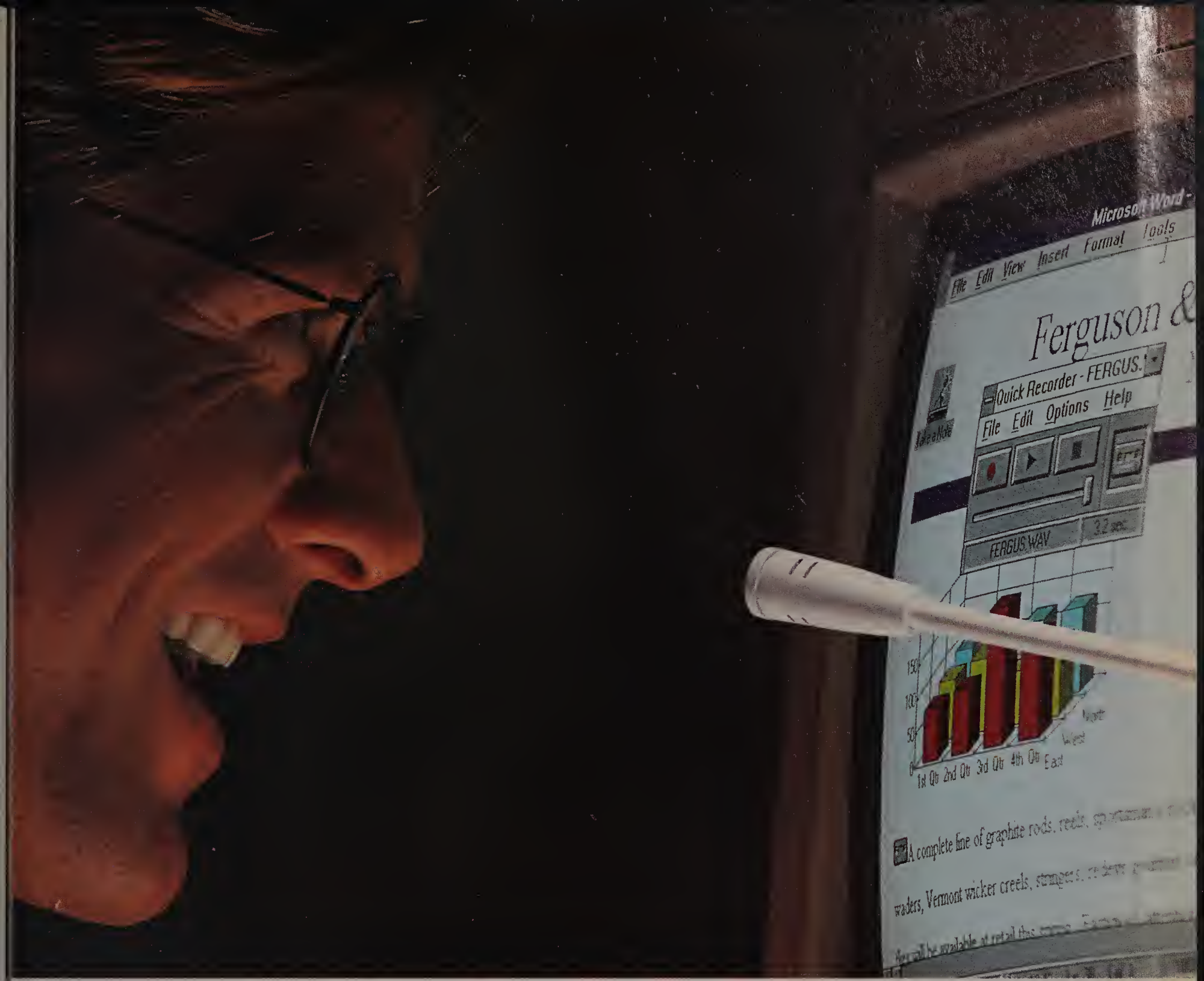
Is software protected by the First Amendment? Maybe not. When Delrina released the Opus 'n Bill Screen Saver—a collection of animations based on Berkeley Breathed's *Bloom County* and *Outland* comic strips—the company discovered it doesn't have the freedom Breathed enjoys in print.

As the product shipped, Berkeley Systems, maker of After Dark, sued Delrina over an Opus 'n Bill module in which Opus tried to shoot down After Dark's flying toasters. Berkeley Systems argued that Delrina's toasters were a trademark infringement. A U.S. District Court agreed, ordering the program recalled.

That was only the beginning. Three of the package's modules and its cover parodied Bill Gates, and Gates's lawyers asked Delrina to remove these references. A Microsoft spokesperson said, "We believe that [Opus 'n Bill] is a commercial product and that Bill Gates has [a right to] control how his likeness is used." Parodies of Gates in print are okay because "a newspaper isn't a commercial product, but a publication." A Delrina spokesperson said the company had decided to remove the offending material before being contacted by Gates's attorneys. But in Breathed's analysis, "Mr. Gates's people blew their nose our way, and Delrina ducked."

Opus 'n Bill is now sold with a Censored Toasters module and no Gates jokes. Breathed will still lampoon Gates in print but concludes, "If you put satire on paper and sell it, it's legal...put the same material on a floppy disk and sell it, it's a court case."

JOHN GREENLEIGH



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Tune In, Turn On: Sound, Cellular Now on Cards

TEST DRIVE

Now that PCMCIA slots are becoming checklist items for portable-PC buyers, vendors have started introducing PC Card devices with greater power and sophistication. Among the latest PCMCIA cards are cellular-ready fax-modems from Megahertz and U.S. Robotics, as well as 16-bit stereo sound cards from smaller vendors such as New Media Corporation and DSP Solutions.

While cellular modems have been shipping for some time, Megahertz and U.S. Robotics are among the first to combine cellular and land-line capabilities in a PCMCIA Type II card. Both modems offer 14.4-kilobit-per-second performance for data and faxes and V.42bis 4-to-1 data compression.

The $459 Megahertz PCMCIA Cellular Fax Modem works with the Mitsubishi 3500SPK and 4000SPK, the NEC P100, and the Diamondtel 20 and 22 cellular phones. The fax-modem comes with a cellular connector that plugs into these phones, so you don't have to buy an extra interface device. (Megahertz plans to support additional cellular phones in the near future.) The modem features Microcom's robust MNP-10 error correction protocol, designed for the rigors of cellular transmission (calls frequently get passed from one cell to another).

U.S. Robotics' WorldPort Dual Standard Cellular Fax PCMCIA costs $995 and includes the company's proprietary HST protocol, which lets it communicate at 16.8 kbps with other U.S. Robotics HST-compatible modems. In addition, it features the new HST Cellular protocol, which offers speeds from 8 kbps to 12 kbps, according to the company.

Don't confuse these cellular modems with the upcoming Cellular Digital Packet Data (CDPD) modems scheduled to ship this year. Designed to transmit data more reliably, CDPD modems will send data in packets across cellular networks. By comparison, conventional cellular and land-line modems send data in bitstreams.

Not every notebook user needs stereo-quality sound, but those who do know what audio can add to a business presentation. And because presentations often take place at a client's office, a trade show, or away from your desk, the PCMCIA form factor is a logical choice for sound cards.

New Media's $399 .WAVjammer is a 16-bit stereo sound card that plugs into any Type I slot. It has an external module to connect a headphone, a microphone, or speakers. You can import audio from an external source, such as a CD or tape player. .WAVjammer includes Microsoft's Windows Sound System 2.0 software.

DSP Solutions' $279.95 Portable Sound Port Plug PCMCIA is a Type II stereo sound card with a connector for a bundled external speaker/microphone. You can connect another speaker and external mike for higher-quality recording.

—Jeff Bertolucci

Megahertz Cellular Modem

A Type II fax-modem with MNP-10 for reliable cellular.
Pricing: $459
Megahertz Corp., 801/272-6000
Reader service no. 836

.WAVjammer

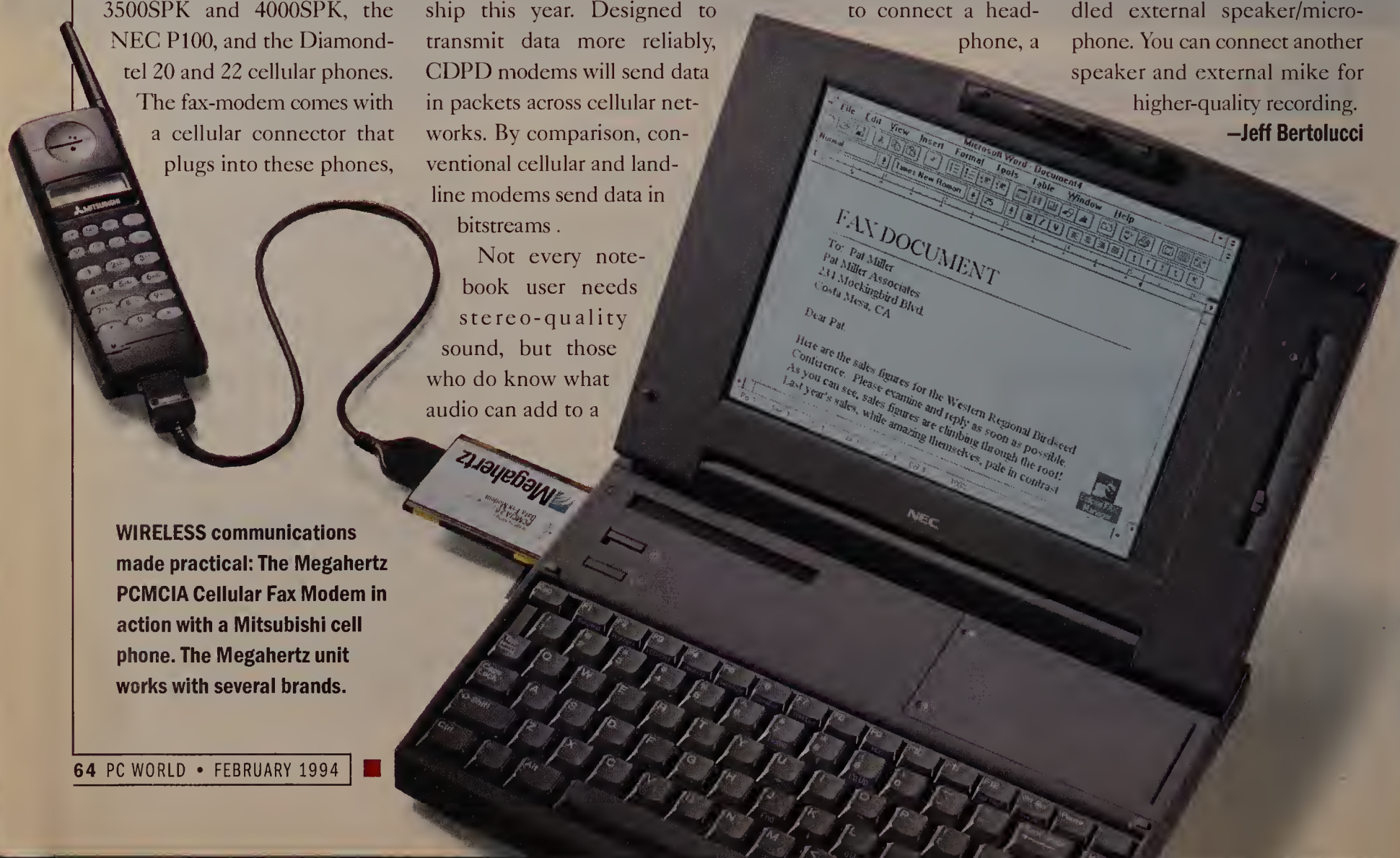
A 16-bit stereo sound card for PCMCIA Type II slots.
Pricing: $399
New Media Corp.,714/453-0100
Reader service no. 838

Portable Sound PCMCIA

Stereo sound with external microphone/speaker.
Pricing: $279.95
DSP Solutions, 415/494-8086
Reader service no. 837

WorldPort Cellular Fax

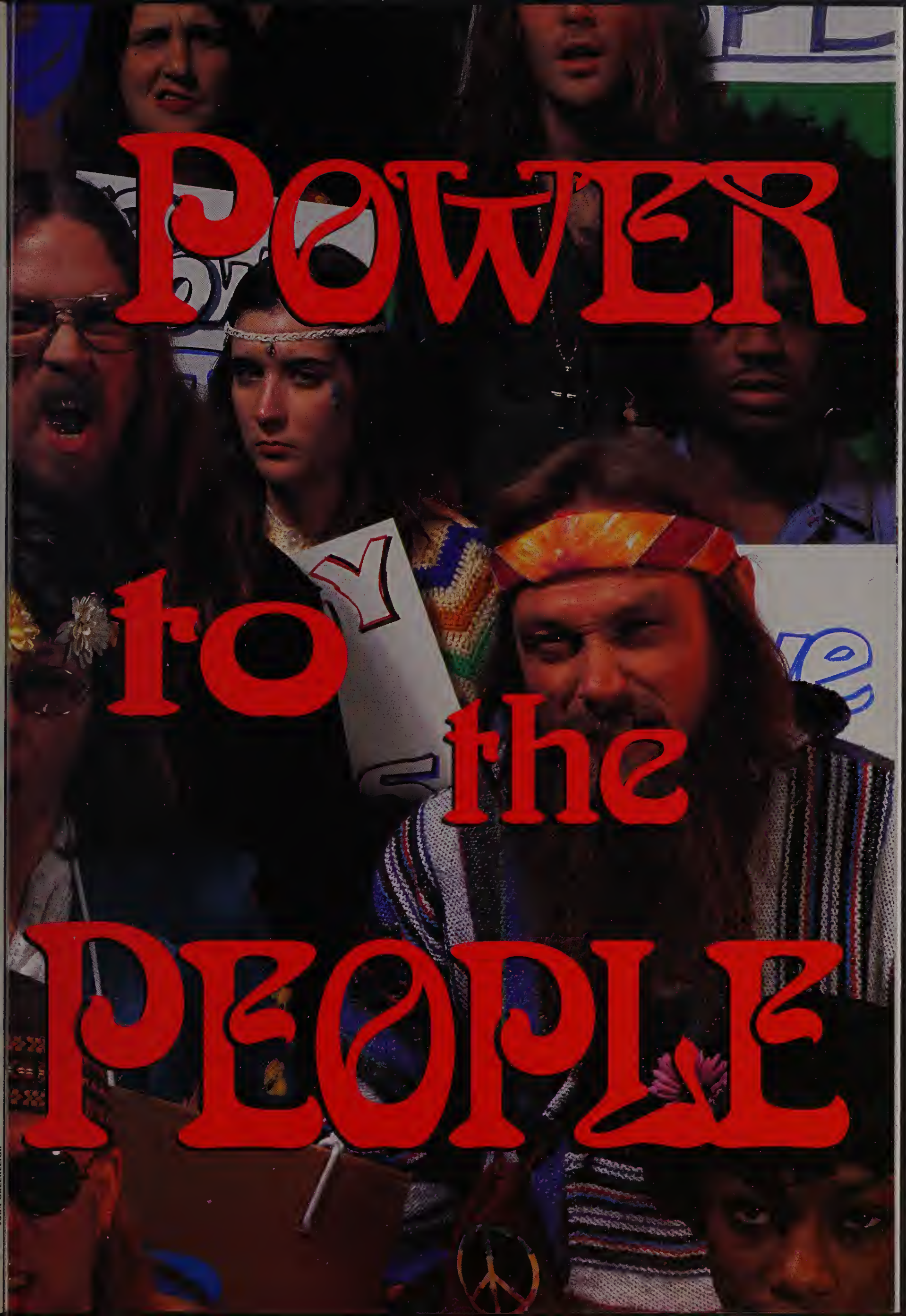
Features U.S. Robotics' new HST cellular protocol.
Pricing: $995
U.S. Robotics, 708/982-5010
Reader service no. 839



WIRELESS communications made practical: The Megahertz PCMCIA Cellular Fax Modem in action with a Mitsubishi cell phone. The Megahertz unit works with several brands.

JOHN GREENLEIGH

POWER to the PEOPLE



Now more than ever, we're giving power to the people. Our Pentium-based PCI systems are priced hundreds, sometimes thousands of dollars less than competitors' comparably configured Pentium systems. That's PC power everyone can afford!

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1993

Best Service
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Best Service

You Got It, Baby!

By the Time We Get to Woodstock

When historians write the history of the personal computer industry years from now, they'll remember Gateway 2000™ as the radical PC manufacturer that gave power to the people by selling the highest-quality, latest-technology computers at affordable prices. By showing PC buyers a level of service they thought was a throwback to the peace and love era. By giving real meaning to the tattered, worn-out term "value."

When Gateway 2000 came onto the scene, the establishment computer companies were charging whatever they wanted for technology. Gateway was a real downer to them because we began selling the same technology for a whole lot less. And the buyers were very smart. They shouted, "Hell no, we won't go," to the big companies, and took a chance on the revolutionary Midwest company called Gateway 2000. Soon a great legion of people — even more than Woodstock attracted — was buying Gateway PCs.

Today, Gateway 2000 is bigger than many of the companies for which it was an alternative. So why should you buy a Gateway computer today? Same reasons as in the beginning. You still get the best price, quality and service from us.

Demonstrations

That's why, for the third consecutive year, we swept *Computer Shopper's* Best Buy Awards, winning every product award we were eligible for and being chosen as the Best Overall Systems Supplier. (Thanks, *Shopper* readers!) That's why we took five top honors in *PC World's* World Class Awards, including Best Mail Order Company and Best Service and Support. (Thanks, *PC World* readers!) And even though we're now a Fortune 500 company, we still champion anti-establishment thinking. Check it out. You'll find GW2K is far-out, groovy and totally unreal!

We dedicate this ad to the memory of Sol Pessin, one of our special customers who believed in us during the early days. We'll miss you, Sol.

GATEWAY2000

"You've got a friend in the business."®

800-846-2065

Gateway Gives You Performance

The Eagle has Landed

When Gateway introduced a Pentium™-based system — loaded — for under $4,000, everybody in the industry knew the Eagle had landed. The best PC value on the planet had arrived! The editors of *PC/Computing* heralded the accomplishment by naming it Best Desktop of 1993.

Then we topped our achievement by offering *four* Pentium processor-based systems, including a *new 66MHz model*, priced from $2,495 to $3,995. Now that's a giant leap in value for one of the highest-performance PCs on earth. These systems are tomorrow's technology available today at affordable prices — only from Gateway.

Our P5 systems include Intel's 64-bit Pentium processor, which moves instructions and data twice as fast as a 486 system. The P5 PCs get another performance boost from a PCI local bus. The PCI bus can operate 10 to 15% faster than a VESA® local bus. The PCI bus' "plug and play" feature makes your PC easier to use, too, by automatically configuring peripherals.

Space-Age Video

The PCI bus is coupled with a space-age video system, with 2MB standard video memory giving you 64,000 colors at 1024 x 768 resolutions. The PCI-based video system uses a high-performance 64-bit interface to video memory that achieves 16 million colors, true 24-bit, in VGA and SVGA resolutions. Our standard video system gives you the best overall performance on the market.

The net effect of the PCI local bus and this video system is performance that will send you into orbit. It's definitely far-out!

486 PCI Local Bus System is A-OK

The PCI local bus and PCI video system are also available in a 66MHz 486DX2 system, Intel® verified to be Pentium upgradable. Another A-OK value in a high-performance system from Gateway!

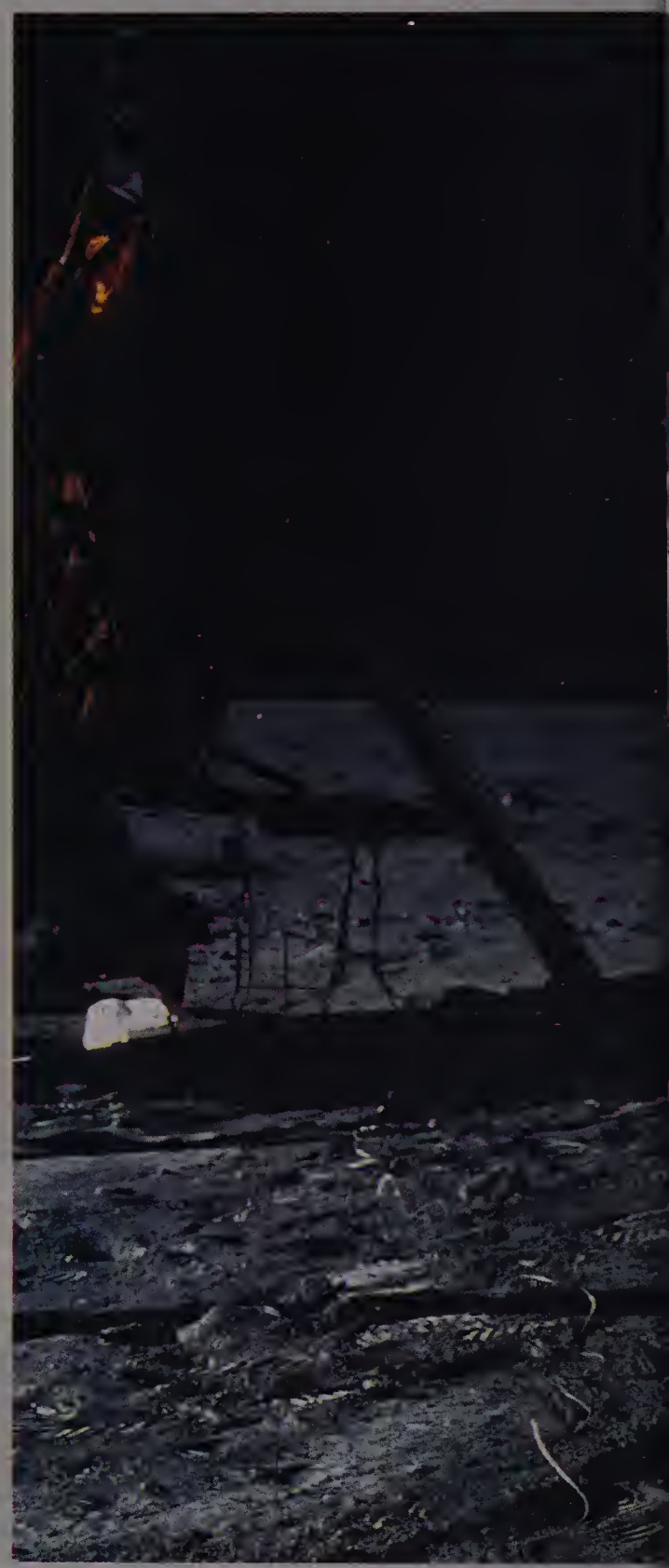


Photo courtesy of NASA. Thanks!

GATEWAY2000

"You've got a friend in the business."®

800-846-2065

That's Out Of This World!

Our P5-60 was named Best Desktop of 1993 by the editors of PC/Computing. *"(It) is nearly twice as fast as its nearest competitor at Windows operations. When it comes to top-of-the-line desktop systems, you can't beat high performance for a low price," states the editorial.*

New this month is our 66MHz Pentium-based system for only $3,995.

Best Desktop of 1993

intel inside

Be A Trend-Setter With A

Our 4DX2-66V model has to be one of the most highly decorated PCs in the history of the industry. For good reason! Like other Gateway VESA and integrated systems, it's a very attractive value.

intel inside

4DX2-66V
Best Desktop

4DX2-66V
Best Windows PC

4DX2-66V

4DX2-66V

Pournelle
4DX2-66V

4DX2-66V

Gateway VESA Or Integrated PC

Our Family PC comes with CD-ROM, sound card, speakers, joystick, fax/modem and multimedia software. You choose one software option from five great Family PC multi-title packages. Some of the outstanding titles you can get are: Microsoft Works,™ Dinosaurs and Encarta,™ Cinemania,™ Time Almanac, Links Golf Collection, The Animals, MicroProse™ Game Pack, MECC Elementary Education Pack — and more!

You'll be a trend-setter in your office or neighborhood if you choose a Gateway VESA® or integrated system because there's nothing more fashionable than a great buy. Everybody wants one!

VESA a Go-Go

Our VESA local bus machines give you go-go performance at a fab price. VESA, which stands for Video Electronics Standards Association, assures you of compatibility with any VESA peripheral. These systems are also upgradable to a Pentium™ OverDrive™ Processor if you need more processor power in the future.

Integrated PCs Sock it to 'Em

Our integrated systems definitely sock it to the competition. Offered in space-saving mini desktop cases, our local-bus integrated PCs give you twice the video performance available in many standard desktop machines. In fact, video performance in our integrated systems is similar to, or better than, that found in many of our competitors' high-end systems.

Of course these machines are also upgradable to a Pentium OverDrive Processor.

Our special Family PC, with full multimedia capabilities and some exciting software choices, is priced at only $1,995. Ask us for details.

If you want a mod PC for the fewest dollars possible, you want an integrated system from Gateway. You can bet your bippy on that!

Energy Stardom

All Gateway 2000™ VESA local bus and integrated systems wear the Energy Star seal to show they comply with energy-saving guidelines established by the EPA. Our commitment to the Energy Star program is just one of the ways we're working to help the environment — and to help you save money!

GATEWAY2000

"You've got a friend in the business."®

800-846-2065

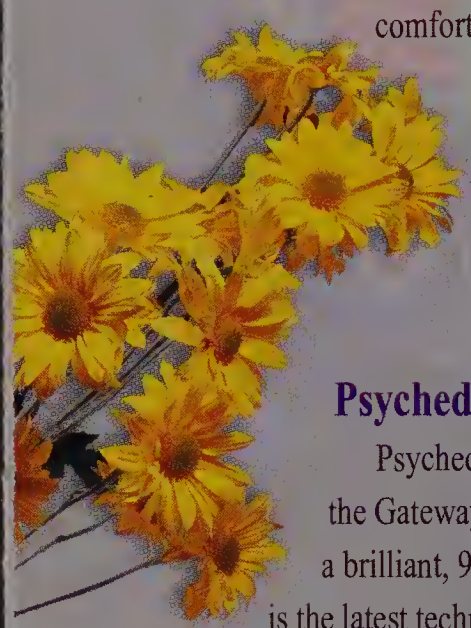
For The Rolling Stone In You,

Whether you travel constantly from continent to continent or occasionally from office to home, Gateway has the perfect portable PC to keep you rollin' on down the highway.

Easy Rider

The revolutionary HandBook® 486 gives you more MIPS per pound than any other PC! Plus, the HandBook is the answer to the most common question seasoned portable users ask themselves: should I take my portable or not? Is it worth the hassel? With a HandBook, you'll never ask yourself that question again. It's so small and light, it's effortless to carry. The decision is automatic: of course you'll take your HandBook. You'll never want to be without it! The HandBook is a truly extraordinary product that will forever change the way you use a PC.

The HandBook has all the features that matter to you, too, including: ideal weight and size (less than 3 pounds, about the size of a day-planner); plenty of power (genuine Intel SL Enhanced 486 processor); great screen (bright, 7.9-inch backlit VGA display); comfortable 78-key keyboard; EZ Point integrated pointer (no need to carry a clumsy mouse); excellent battery life (up to four hours); suspend/resume (a handy feature that allows you to stop work any time and resume later without losing data or restarting the system).



Psychedelic Day-Tripper

Psychedelic color for flower children of all ages. That's the Gateway 2000™ ColorBook™. The ColorBook includes: a brilliant, 9.4-inch VGA color screen (dual-scan STN color is the latest technology in color displays); 486 performance (genuine Intel SL Enhanced 486 processor); excellent portability (weighs less than 5.7 pounds and is ultra-thin — just 1.77 inches); simultaneous video up to 1024 x 768 resolution; a built-in trackball (very easy to use); two PCMCIA Type II slots (can also be used for one Type III PCMCIA card); great battery life (up to four hours); suspend/resume feature.

If you want dazzling color at a mono price, look no further than the ColorBook.

GATEWAY2000

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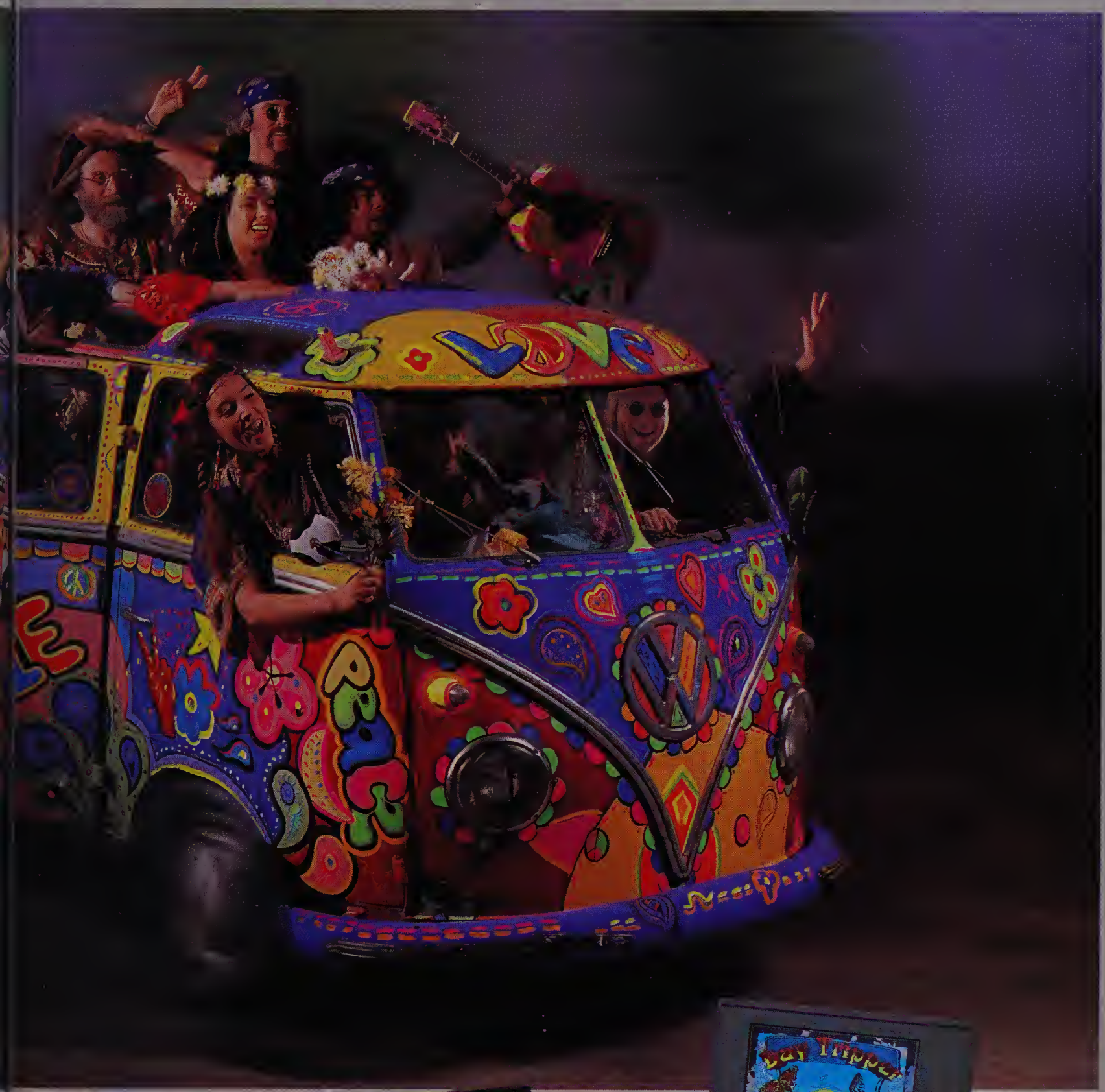
Gateway Has Groovy Portables.



On your next trip, be sure to take along a good book.
That's a HandBook or a ColorBook from Gateway 2000!

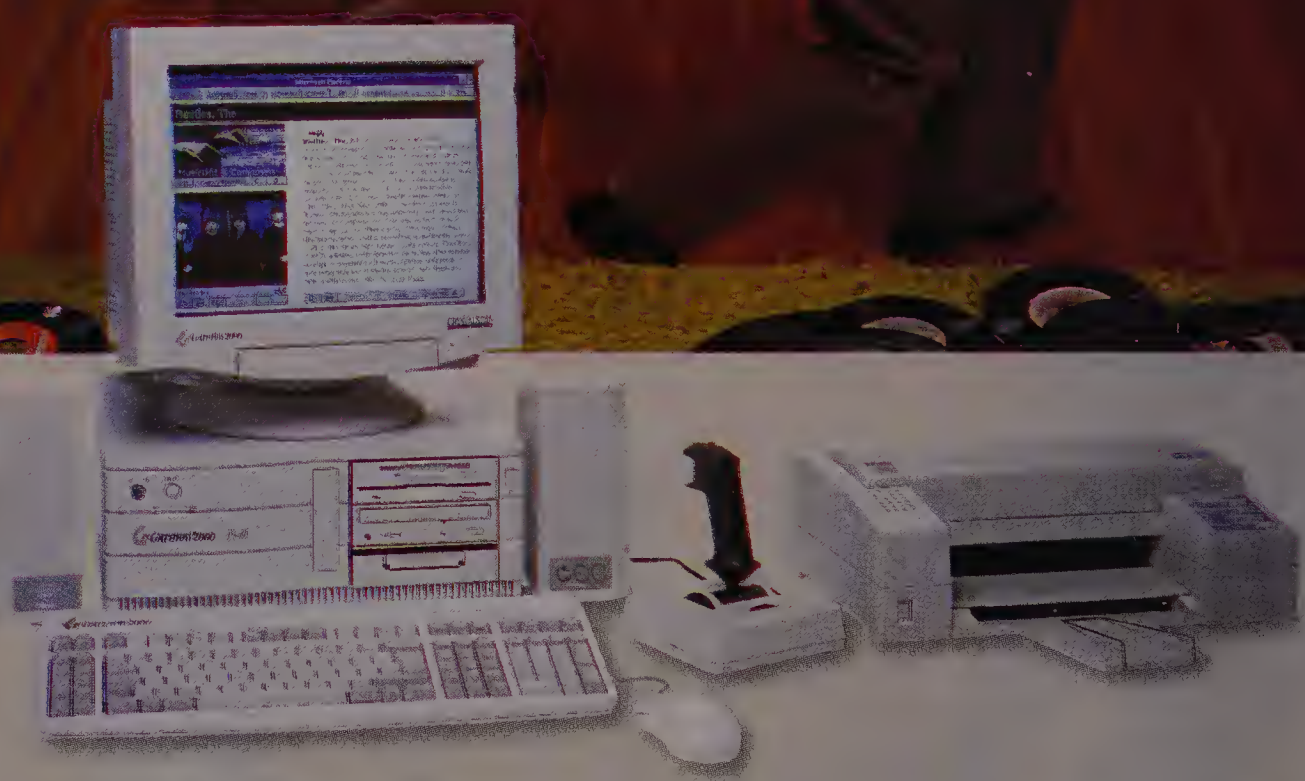
HandBook
Best Subnotebook

HandBook
Best Subnotebook

HandBook
Best Hand-Held/Palmtop

intel inside

Add A Twist



Shown here is our 4DX2-66V model loaded with options including a 17-inch CrystalScan monitor, combo floppy drive, multimedia kit with optional Yamaha speakers, Colorado Memory Systems tape backup unit, FlightStick and Epson Stylus 800 printer. With multimedia, the sights and sounds of any era are available to you with a click of your mouse. Right on!

intel inside

to Your Gateway PC!

When you've picked the PC you want, take a look at the options listed here to make your system as productive and fun as possible. Sorry, the peripherals listed here are sold only with the purchase of a system. For details on our complete line of extras for Gateway customers, ask for our special add-on components division when you call.

Multimedia

Multimedia Kit

Here's everything you need to add multimedia to your Gateway PC:

- Gateway 2000™ 16-bit CD-quality sound card, compatible with Sound Blaster™ cards, with MIDI/game port, mic in, stereo line in/out
- Double-speed CD-ROM drive, tray-loading, compatible with music CDs, multisession photo CDs and CD-ROM titles
- 2 Labtec® speakers that attach to your PC monitor
- Microsoft® Encarta & Corel Photo CD software
- Gateway 2000 System CD with Microsoft Multimedia Pack™

$299

For system configurations that include a CD-ROM drive, get the multimedia kit without CD-ROM drive for: **$132**

Yamaha®YST-M10 Multimedia Speakers

New! The small speakers that sound big. And come with a tiny price. This free-standing, self-powered speaker set is a great value! **$75**

Altec Lansing Multimedia Speakers

Get superior stereo sound with these top-rated Altec Lansing ACS-300 speakers with separate powered subwoofer. **$219**

CH FlightStick

The joystick that's recommended by our kids! With a sensational "feel" and rugged construction, this is the last joystick you'll ever have to buy! **$35**

Communications & Storage

TelePath™ II Fax/Modem

Internal fax/modem, 14,400bps modem, V.32bis, with 14,400bps fax capability. Package includes data and fax communication software, plus a CompuServe® trial membership. **$159**

Cardinal® 2400 Fax/Modem

Internal fax/modem, 2,400bps modem, V.22bis, with 9,600bps fax capability. Package includes data and fax communication software. **$49**

Colorado Memory Systems® TBU

250MB internal automatic tape backup unit copies up to 9.5MB per minute. Comes with Windows and DOS software, one tape and cable. **$159**

Networking

Intel EtherExpress™

A 16-bit Ethernet adapter from a world leader in networking. **$105** Twisted Pair or BNC Kit (BNC kit includes cable, connector, terminator and card).

Ethernet Adapter from 3Com®

Manufactured by 3Com for Gateway. Features parallel tasking architecture with a high level of integration. **$105** Twisted Pair. **$125** BNC Kit (includes cable, connector, terminator and card).

Monitors

CrystalScan® 17-Inch Monitor

Non-interlaced color monitor, .26mm dot pitch. If your system comes with a 14-inch monitor, you can upgrade to this monitor for **$430**. If your system comes with a 15-inch monitor, you can upgrade for **$350**. (Prices good only for upgrades at the time of system purchase.)

Printers

Epson® 1070+ Printer

Here's a value-priced, wide-carriage dot matrix printer that gives you 225cpi in draft mode, 10 letter-quality fonts and 4 scalable fonts. Quiet, too (46.5db)! **$359**

Panasonic Color-Capable Printer

Add color to your documents with this 24-pin dot matrix printer. Includes Adobe Type Manager® KX-P2123 **$259**; Color Option **$50**

Epson Stylus 800 Ink Jet Printer

Great laser quality at an even greater value. Measuring only 17 inches by 10.5 inches, the Stylus 800 has seven different typefaces and prints an extra-quiet 150 characters per second at 360dpi. Parallel cable included. **$289**

Epson ActionLaser 1500 Laser Printer

The ActionLaser delivers professional-quality printouts with crisp, sharp images, black blacks and smooth, "jag-free" lines. It also features a fast six-page per minute print speed, 14 resident fonts, 300 x 300dpi, and 1MB memory expandable to 5MB. Parallel cable included. **$669**

TI MicroLaser™ Pro 600

This Texas Instruments laser printer redefines value in high-performance printing with 6MB RAM standard, a fast eight pages-per-minute print rate, 500-sheet capacity and true 600dpi quality.

With 23 PostScript® Fonts: **$1,449**
With 65 PostScript Fonts: **$1,629**

Lexmark 4039 10R

The printer for tomorrow's technology! Featuring a fast, RISC processor it switches between PostScript and PCL5 printer languages automatically and prints at a remarkable 10 pages per minute at true 600dpi. **$1,399**

Easy Payment Options

We make it easy for you to buy a Gateway PC, too! We accept most major credits cards and C.O.D. terms, with net 30-day terms and leasing options available to qualified commercial customers.

You can also apply for our new Gateway 2000™ DuoLine™ MasterCard® Card, issued by Dial National Bank, which lets you make purchases from Gateway and anywhere else MasterCard is accepted by giving you two lines of credit — one for Gateway purchases and one for all other purchases. For Gateway purchases, the card has no annual fee and a low variable interest rate of just 12.9% APR. For other transactions, you get a variable interest rate of 13.9% APR and a low $18 annual fee.*

**Cash advance fee is $1 plus 2% of the amount of the cash advance, but not less than $5 nor more than $10. Financing is available on approved credit with the Gateway DuoLine MasterCard, issued by Dial National Bank, Des Moines, Iowa.*

GATEWAY2000
"You've got a friend in the business."®

800-846-2065

Our '60s models are all Gateway 2000 employees and their children who relived the flower-power era for this ad.

PORTABLES

HANDBOOK® 486

- Weight: 2.94 Lbs.
- Dimensions: 9.75" x 5.9" x 1.6"
- SL Enhanced Intel® 486 Processor
- 4MB RAM (expands to 8MB or 20MB)
- 80 to 130MB IDE Hard Drive
- 7.9" Backlit VGA Display
- NiMH Battery & AC Pack
- Suspend/Resume Feature
- 1 PCMCIA Type II Slot
- EZ Point™ Integrated Pointer
- 78-Key Keyboard
- Parallel, Serial & PS/2 Ports
- MS-DOS,® Windows™ & Serial Transfer Cable

HANDBOOK 486SX-25
With 25MHz 486SX CPU and 80MB Hard Drive
$1495

HANDBOOK 486DX2-40
With 40MHz 486DX2 CPU and 130MB Hard Drive
$1995

HANDBOOK PACKS

Traveler's Packs:
- Microsoft Works for Windows, case, extra battery & PCMCIA 9600/2400 fax/modem. **$369**
- Microsoft Works for Windows, case, extra battery & PCMCIA TelePath™ fax/modem. **$489**

Presenter's Pack:
- PCMCIA VGA adapter, Asymetrix® Compel & case. **$319**

PORTABLE OPTIONS

PCMCIA Cards:
- TelePath 14400/14400 fax/modem. **$319**
- 9600/2400 fax/modem. **$199**
- Ethernet adapter. **$189**
- Token Ring adapter. **$449**
- HandBook VGA adapter. **$229**

Batteries:
- 2.2Ah NiMH batteries. **$89**
- Alkaline battery pack. **$29**

Diskette Drive:
- HandBook external 1.44MB. **$99**

Cases:
- ColorBook **$49** HandBook **$55**

Extended VIP Warranty:
- We'll ship a replacement within 24 hours during warranty. Point of sale only. **$100**

COLORBOOK™

- Weight: Under 5.7 Lbs.
- Dimensions: 11.7" x 8.5" x 1.77"
- SL Enhanced Intel 486 Processor
- 4MB RAM (expands to 8, 12 or 20MB)
- 3.5" 1.44MB Diskette Drive
- Removable 80 to 250MB IDE Drive
- 9.4" VGA Dual-Scan STN Color Display
- NiMH Battery & AC Pack
- Suspend/Resume Feature
- 2 PCMCIA Type II Slots
- Integrated Trackball (2 buttons)
- 85-Key Keyboard
- Parallel, Serial & PS/2® Ports
- External VGA Port
- MS Works for Windows™
- MS-DOS and Windows

COLORBOOK 486SX-25
With 25MHz 486SX CPU and 80MB Hard Drive
$1995

COLORBOOK 486SX-33
With 33MHz 486SX CPU and 170MB Hard Drive
$2395

COLORBOOK 486DX-33
With 33MHz 486DX CPU and 250MB Hard Drive
$2795

COLORBOOK PACKS

Traveler's Packs:
- Case, extra battery & PCMCIA 9600/2400 fax/modem. **$329**
- Case, extra battery & PCMCIA TelePath fax/modem. **$449**

NOMAD 450DXC

- Weight: 6.2 Lbs.
- Dimensions: 8.5" x 11" x 2.2"
- 50MHz Intel 486DX2 CPU
- 8MB RAM
- 3.5" 1.44MB Diskette Drive
- 200MB IDE Hard Drive
- 8.4" ColorActiveMatrix Screen
- NiMH Battery & AC Pack
- Simultaneous Video with 1MB
- 79-Key Keyboard & Mouse
- 9600/2400 Fax/Modem
- 1 Parallel, 1 Serial Port
- MS-DOS, Windows & Works

$3995

MULTIMEDIA KIT

Here's everything you need to add multimedia to any Gateway desktop PC. You won't find a better holiday price anywhere!
- Gateway 2000 16-Bit Sound Card, Sound Blaster-™Compatible
- Double-Speed CD-ROM
- 2 Labtec® Speakers
- Microsoft Encarta & Corel Photo CD Software
- Gateway System CD

$299

For system configurations that include a CD-ROM drive: **$132**
Only with system purchase.

SOFTWARE & EXTRAS

If a system comes with "choice of application software," choose one of the following packages:
- Microsoft Excel for Windows™
- Microsoft Word for Windows™
- Microsoft Word and Bookshelf '92,® CD-ROM Edition
- Microsoft PowerPoint for Windows™
- Microsoft Project for Windows™
- The Entrepreneur Pack (Works,™ Publisher,™ Money™ & games)
- Borland Paradox® database and Quattro® Pro for Windows spreadsheet
- Microsoft Access™ for Windows

With desktop and selected portables you also get the following software and extras at no additional charge:
- MS-DOS 6.2 & Windows for Workgroups 3.11
- CoSession™ Host Remote Diagnostics (with all modems)
- Kiplinger's™ CA-Simply™ Money
- QAPlus Diagnostics
- Gateway Computer Glossary
- Gateway Mouse Pad

Systems with CDs also include:
- Gateway System CD with Microsoft Multimedia Pack™
- Multimedia On-Line User's Guide
- Gateway Mall On-Line Catalog

SERVICE

Every Gateway system is backed by:
- 30-Day Money-Back Guarantee
- One-Year Limited Warranty
- Lifetime Toll-Free Technical Support
- On-Site Service Available To Most Locations
- Lifetime BBS Membership
- FaxBack Automated Fax Service

Our money-back guarantee does not include shipping. On-site service is provided at no charge during warranty if our technicians determine it is necessary. If you'd like to read our warranty and guarantee policies, please call for a free copy.

Printed on recycled paper with soy inks.

Gateway 2000 is a corporate sponsor of

INTEGRATED & VESA SYSTEMS

4SX-33/4DX-33

- Intel 33MHz 486SX or DX CPU
- 4MB RAM
- 212MB 13ms IDE Hard Drive
- Local Bus Graphics with 512KB
- 3.5" Diskette Drive
- 14" Color CrystalScan® 1024NI
- Mini Desktop Case
- 5 16-Bit ISA Slots
- 101-Key Keyboard & MS Mouse
- MS-DOS® 6.2 & WFW™ 3.11
- MS Works for Windows™
- EPA Energy Star Compliant

4SX-33 - **$1295**

4DX-33 - **$1495**

4DX2-50/4DX2-66

- Intel 50 or 66MHz 486DX2 CPU
- 4MB RAM, 128KB Cache
- 424MB 13ms IDE Hard Drive
- Local Bus Graphics with 1MB
- 3.5" Diskette Drive
- 14" Color CrystalScan 1024NI
- Mini Desktop Case
- 5 16-Bit ISA Slots
- AnyKey® Keyboard & MS Mouse
- MS-DOS 6.2 & WFW 3.11
- Choice of Application Software
- EPA Energy Star Compliant

4DX2-50 - **$1795**

4DX2-66 - **$1995**

4SX-33V

- Intel® 33MHz 486SX CPU
- 4MB RAM
- 212MB 13ms IDE Hard Drive
- VLB™ Graphics with 1MB
- Local Bus IDE Interface
- 5.25" & 3.5" Combo Drive
- 14" Color CrystalScan® 1024NI
- Baby AT Case
- 5 ISA & 2 VESA®/ISA Slots
- AnyKey® Keyboard & MS Mouse
- MS-DOS® 6.2 & WFW™ 3.11
- Choice of Application Software
- EPA Energy Star Compliant

$1495

4DX2-50 FAMILY PC

- Intel 50MHz 486DX2 CPU
- 8MB RAM, 128KB Cache
- 212MB 13ms IDE Hard Drive
- Local Bus Graphics with 1MB
- Double-Speed CD-ROM, 16-Bit Sound Card & Speakers
- 2400/9600 Data/Fax Modem
- 3.5" Diskette Drive
- 14" Color CrystalScan 1024NI
- Mini Desktop Case
- 5 16-Bit ISA Slots
- 101-Key Keyboard, MS Mouse & Joystick
- Choice of Family PC Software
- EPA Energy Star Compliant

$1995

VESA & PCI SYSTEMS

4DX-33V/4DX2-50V

- Intel 33MHz 486DX or 50MHz DX2 CPU
- 8MB RAM, 128KB Cache
- 424MB 13ms IDE Hard Drive
- VLB Graphics with 1MB
- Local Bus IDE Interface
- 5.25" & 3.5" Combo Drive
- 14" Color CrystalScan 1024NI
- Baby AT Case
- 5 ISA & 2 VESA/ISA Slots
- AnyKey Keyboard & MS Mouse
- MS-DOS 6.2 & WFW 3.11
- Choice of Application Software
- EPA Energy Star Compliant

4DX-33V - **$1975**

4DX2-50V - **$1995**

4DX2-66V BEST BUY

- Intel 66MHz 486DX2 CPU
- 8MB RAM, 128KB Cache
- 424MB 13ms IDE Hard Drive
- VLB Graphics with 1MB
- Double-Speed CD-ROM
- Local Bus IDE Interface
- 3.5" Diskette Drive
- 15" Color CrystalScan 1572FS
- Baby AT Case
- 5 ISA & 2 VESA/ISA Slots
- AnyKey Keyboard & MS Mouse
- MS-DOS 6.2 & WFW 3.11
- Choice of Application Software
- EPA Energy Star Compliant

$2295

P4D-66

- Intel 66MHz 486DX2 CPU
- 8MB RAM, 256KB Cache
- 424MB 13ms IDE Hard Drive
- PCI Local Bus Graphics with 2MB
- Double-Speed CD-ROM
- 3.5" Diskette Drive
- 15" Color CrystalScan 1572FS
- Baby AT Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- AnyKey Keyboard & MS Mouse
- MS-DOS 6.2 & WFW 3.11
- Choice of Application Software

$2495

4DX2-66V

- Intel 66MHz 486DX2 CPU
- 16MB RAM, 128KB Cache
- 424MB 13ms IDE Hard Drive
- VLB Graphics with 2MB
- Double-Speed CD-ROM
- Local Bus IDE Interface
- 3.5" Diskette Drive
- 15" Color CrystalScan 1572FS
- Baby AT Case
- 5 ISA & 2 VESA/ISA Slots
- AnyKey Keyboard & MS Mouse
- MS-DOS 6.2 & WFW 3.11
- Choice of Application Software
- EPA Energy Star Compliant

$2795

PENTIUM SYSTEMS

P5-60

- Intel 60MHz Pentium™ CPU
- 8MB RAM, 256KB Cache
- 424MB 13ms IDE Hard Drive
- PCI Local Bus Graphics with 2MB
- 3.5" Diskette Drive
- 14" Color CrystalScan 1024NI
- Baby AT Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- AnyKey Keyboard & MS Mouse
- MS-DOS 6.2 & WFW 3.11
- MS Works for Windows

$2495

P5-60 BEST BUY

- Intel 60MHz Pentium CPU
- 8MB RAM, 256KB Cache
- 424MB 13ms IDE Hard Drive
- PCI Local Bus Graphics with 2MB
- Double-Speed CD-ROM
- 3.5" Diskette Drive
- 15" Color CrystalScan 1572FS
- Baby AT Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- AnyKey Keyboard & MS Mouse
- MS-DOS 6.2 & WFW 3.11
- Choice of Application Software

$2795

P5-60

- Intel 60MHz Pentium CPU
- 16MB RAM, 256KB Cache
- 540MB 13ms IDE Hard Drive
- PCI Local Bus Graphics with 2MB
- Double-Speed CD-ROM
- 3.5" Diskette Drive
- 15" Color CrystalScan 1572FS
- Baby AT Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- AnyKey Keyboard & MS Mouse
- MS-DOS 6.2 & WFW 3.11
- Choice of Application Software

$3295

P5-66

- Intel 66MHz Pentium CPU
- 16MB RAM, 256KB Cache
- 540MB 13ms IDE Hard Drive
- PCI Local Bus Graphics with 2MB
- Double-Speed CD-ROM
- 16-Bit Sound Card & Speakers
- 3.5" Diskette Drive
- 17" Color CrystalScan 1776LE
- Tower Case, 300W Power Supply
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- AnyKey Keyboard & MS Mouse
- MS-DOS 6.2 & WFW 3.11
- Choice of Application Software

$3995

MICROSOFT® WINDOWS™ READY-TO-RUN

energy EPA POLLUTION PREVENTER

GATEWAY 2000

"You've got a friend in the business."®

800-846-2065

intel inside®

Phone 605-232-2000 • TDD 800-846-1778 • Fax 605-232-2023 • FaxBack 605-232-2561 • Add-On Sales 800-846-2080
Toll free from Canada and Puerto Rico 800-846-3609 • Sales Hours: 7am-10pm Weekdays, 9am-4pm Saturdays(CST)

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All-in-One Fax, Print, and Copy From Ricoh and Savin

Two new multifunction machines from Ricoh and Savin let you fax, copy, and print from a single unit. Clearly, combining several devices into one saves money and desk space compared to stand-alone products.

However, buyers should note that these products deliver mixed, though acceptable, results. They were designed as fax machines first, with copying and printing features added as an afterthought. Hence, the printer and copier features are weaker than those of stand-alone products. In addition, combining multiple devices into one can lead to conflicts: If the unit is busy performing one function—say, receiving a fax—it can't print or copy until the task in progress is completed.

Small Office in a Box

Ricoh's $1845 Fax800 combines a low-end plain-paper fax machine with a 360-dot-per-inch (dpi) ink jet printer—a savings of about $200 compared to purchasing those devices separately, the vendor claims. The Fax800's footprint measures a compact 14.1 by 13.7 inches. The product is a good choice for small-office or home users who have modest printing and occasional copying needs.

Printing is not this product's best feature. The Fax800 prints at a poky 1 page per minute, which is fine for short documents but tedious for long reports. I found the output a little jaggy but acceptable for an ink jet. The product includes five resident bit-mapped fonts and supports popular Epson, IBM Proprinter, and Canon emulations. The 100-sheet paper cassette is more than adequate for a single user.

Like other comparable fax devices, the Fax800's copier is somewhat limited. It's useful only for short documents and for people with too much time on their hands. Specifically, you can't make multiple copies of a document. If you want a second copy, you must reinsert the original. In addition, the automatic document feeder holds only ten pages at a time. To copy a longer document, you must feed pages in groups.

The 9600-bits-per-second (bps) Group 3 fax unit is the best feature. It offers a full array of capabilities, including fax broadcasting, fax forwarding, and enough RAM to fax 29 pages at one time. Fax forwarding routes incoming faxes to an alternate number—useful for when you're out of the office.

Multifunction for Work Groups

The $4650 Savinfax 3670 incorporates a robust fax machine, a 10-page-per-minute (ppm) laser printer, and a light-duty copier into a single unit—a savings of about $2000 over comparable stand-alone devices, the vendor claims. This unit is acceptable for a two- to three-person office or as a backup printer, copier, and fax machine for a larger office.

The 3670 holds its own as a printer. The 300-dpi unit has a Motorola 68000 processor and supports popular emulations, including PCL 4 and PCL 5. I found the output a little jaggy but otherwise comparable to that of other 300-dpi printers.

This printer can be shared. It sports parallel and serial interfaces, and offers auto-switching to respond to the port receiving data. The paper tray holds 250 sheets; an optional $595 tray boosts capacity to 750 sheets. Though the 10-ppm engine is adequate for small groups, the device I reviewed had a software bug that slowed it to less than half that speed. Savin says this has been corrected.

Ricoh Fax800, Savinfax 3670

Two multifunction products that pack a fax, a printer, and a copier into a single economical unit.

Ricoh Corp.
800/227-4264
List price: $1845
Reader service no. 641

Savin Corp.
203/967-5000
List price: $4650
Reader service no. 642

The 3670's copier is what's known as personal and is ideal for routine jobs. It copies 10 pages per minute and can make up to 99 copies of a single document. Like the Fax800, this copier produces jaggy, low-resolution copies that are fine for in-house documents but inadequate for distributing to clients.

As with the Fax800, the 3670's best features are its fax capabilities, which include fast 14.4-kilobits-per-second (kbps) performance and fax broadcasting. The unit can perform certain functions simultaneously; for instance, it can print an incoming fax while it stores an outgoing fax in RAM for transmission at a later time.

These two multifunction devices aren't for everyone or for every situation. But when carefully matched with the right circumstances, they can save both time and money.

—Randy Ross

THE SAVINFAX 3670 combines a basic 10-ppm laser printer with a low-end copier and a feature-packed fax machine.

Multimedia by Memphis

MEMPHIS COMBINES a double-speed CD ROM drive, CD-quality sound, and detachable speakers.

Media Vision's Memphis Multimedia Upgrade System is the kind of product that makes you sit up and take notice that the days of the plain-vanilla PC are gone. And this all-in-one multimedia-component system not only looks cool, it's hot.

Memphis, the latest twist on multimedia upgrade kits for 386 and 486 systems, is a stylish, highly integrated multimedia engine that connects to your PC. Behind the sleek design, Memphis provides 16-bit stereo sound, a double-speed CD ROM drive, and speakers that you can lay flat or stand upright. The unit is designed to support the weight of a monitor, so you can use it as a pedestal for your display to save some desk space. Since Memphis comes with its own AC power supply, you can also use it as a stand-alone CD player.

The kit includes an ISA add-in card that connects Memphis to your PC. Memphis's installation software automatically selects direct memory access (DMA) and interrupt request (IRQ) channels for the unit—a tricky procedure when performed manually (ask anyone who's ever installed a sound card or a CD ROM drive). However, you can perform this feat manually if you wish.

Memphis's rear panel contains a variety of clearly defined I/O ports, including MIDI, microphone, speaker, and standard RCA-type connectors for external audio devices. Memphis ships with a clip-on microphone—useful for using simple voice-command software with your Windows applications. The kit includes two CD ROM titles: Broderbund Software's Arthur's Teacher Trouble and Compton's Interactive Encyclopedia. The Windows software bundled with Memphis lets you play both MIDI and WAV sound files.

While Memphis is a well-designed package, its $999 list price is a bit steep for the multimedia dabbler. But if you want the latest in sound and video and are willing to pay the price, then consider taking a trip to Memphis.

—Jeff Bertolucci

Memphis Multimedia Upgrade System

An integrated multimedia-component system for 386 and 486 PCs.
Media Vision
800/845-5870,
510/770-8600,
510/770-8648 (fax)
List price: $999
Reader service no. 643

Talk to Your PC Like a Pro

The Sound Galaxy PRO 16 Extra sound board features voice recognition capabilities, giving you the power to control Windows programs with your voice.

This $219 16-bit sound board from Aztech Labs comes with Telaccount's Com Voice Speech Recognizer for Windows. Com Voice ships with a basic vocabulary of 40 commands, such as *file open*, *up*, and *right*. To add a voice command, you have to repeat it three times to train the software.

Com Voice lets you create your own libraries of commands, with up to 400 commands per library and an unlimited number of libraries. However, only one command library can be active at a time. This restriction means the product won't work for dictation, since that generally requires a minimum active vocabulary of several thousand words.

Voice recognition could come in handy for users who have to do heavy word processing. You could create a "word processor" library of commands with entries like "bold," which would save you keystrokes. Voice commands are also helpful for mouse-intensive work such as drawing or desktop publishing—you don't have to move the mouse out of the work area to execute menu commands like those used to save and format text.

The sound board comes with a microphone, headphones, and a group of multimedia software titles. These multimedia programs let you do tasks such as record voice messages to embed in a document or attach to an E-mail message. The board fits in a 16-bit ISA slot and requires a 386-class or better PC with 4MB of RAM.

The Sound Galaxy PRO 16 Extra sound board provides a 44.1-kHz sampling rate for CD-quality recording and playback. For business users embedding voice messages in documents, this CD-quality sound is more than adequate. But those doing musical work with MIDI files may need more clarity. For such users, Aztech offers the $169 WavePower daughterboard upgrade, which supports 16-bit pulse code modulation wave-table synthesis. (Wave-table synthesis produces more realistic music by using digital samples of musical instruments.)

—Laurianne McLaughlin

Sound Galaxy PRO 16 Extra

This 16-bit sound card delivers CD-quality sound and includes voice recognition software for navigating Windows applications.
Aztech Labs Inc.
510/623-8988
List price: $219
Reader service no. 644

DX17F
GREEN ENERGY
MONITOR

DX15F
GREEN ENERGY
MONITOR

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MAG INNOVISION

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Circle 151 on reader service card

A Trio of Low-Priced Lasers From Samsung

Protegé 5000, 5050, 5600

Samsung's new trio of low-priced laser printers is targeted at individuals and small work groups.

Samsung Electronics America
800/726-7864
Price: 5000 $1149 (list), 5050 $599 (street), 5600 $995 (list)
Reader service no. 647

Samsung, previously a minor player in the laser printer market, has hit the big leagues with three new printers expected to sell for less than $1000 on the street.

One model, the Protegé 5000, is worth considering if you're a desktop publisher who wants PostScript or if you work in a mixed PC-Macintosh setup.

This LED printer is powered by a 300-dpi, 5-ppm Samsung engine and includes a RISC processor for speeding through complex graphics. The 5000 also includes an AppleTalk port in addition to the standard serial and parallel ports. Automatic interface switching lets the printer automatically switch to the port actively receiving data. Automatic emulation sensing lets the printer automatically adjust to accept either PCL or PostScript data streams. The Protegé 5000 includes 35 PostScript fonts, 8 scalable fonts, and 14 bit-mapped fonts. It's expected to sell for less than $1000 on the street.

The Protegé 5000's 250-sheet paper tray can handle the printing needs of a small work group. (Samsung plans to offer an additional 250-sheet tray.) The unit comes with 2MB of RAM expandable to 6MB and a Hewlett-Packard–compatible slot for adding font cartridges. One drawback for desktop publishers: The 5000 doesn't offer font smoothing technology to help eliminate jagged character edges when printing at large point sizes.

Another model, the Protegé 5050, is a graphics device interface (GDI) printer that is powered by the 300-dpi, 5-ppm Samsung engine. GDI printers work only with Windows-equipped PCs. These printers communicate directly with Windows, minimizing processing and increasing performance. The street price for the 5050, which includes 512K of RAM and a 250-sheet paper tray, is expected to be $599.

If you need high-resolution 600-dpi printing, say for large graphics, Samsung offers a low-priced option. The $995 Protegé 5600 is a 600-dpi, 5-ppm printer with enhanced PCL 5E emulation. It includes a RISC processor and serial and parallel ports with interface switching. Unfortunately, PostScript is not yet available as an upgrade option, though Samsung plans to offer it sometime in 1994.

—Randy Ross

THE PROTEGÉ 5000 includes a RISC processor.

Two Sound Boards for Audiophiles

Orchid SoundWave 32, Reveal SoundFX Wave 32

The latest wave in sound boards by Orchid and Reveal features wave-table MIDI.

Orchid Technologies
800/767-2443, 510/683-0300, 510/490-9312 (fax)
List price: $299
Reader service no. 645

Reveal Computer Products Corp.
800/326-2222, 818/340-3671 (fax)
List price: $299
Reader service no. 646

When PC-based sound boards moved from tinny 8-bit sound to CD-quality 16-bit sound, it was regarded as a major—albeit expensive—step toward high-fidelity computing. Now a pair of sound boards, the Orchid SoundWave 32 and the Reveal SoundFX Wave 32, address the new high end with powerful digital signal processors (DSPs) and wave-table MIDI for realistic playback of musical scores.

Both the SoundWave 32 and the SoundFX Wave 32 feature 16-bit, 44.1-kHz recording and playback. Both employ DSPs for a variety of tasks and include software to create, edit, and play back WAV and MIDI files.

The SoundWave 32 targets a broad audience of home and office users, employing an Analog Devices DSP to emulate all the major sound standards, including SoundBlaster, AdLib, Roland MT-32, and Microsoft Sound System. Approximately 200 MIDI samples provide realistic playback of music. The sound board comes with a microphone and speakers and includes ports for popular Sony and Mitsumi CD ROM drives.

Reveal's SoundFX Wave 32 concentrates on MIDI quality. While it features wave-table MIDI like the Orchid board, the SoundFX uses custom components to achieve maximum fidelity from MIDI files. Teaming up with Ensoniq, a major keyboard maker, Reveal claims that its MIDI samples and controls deliver near–studio-level quality. In addition, the SoundFX Wave 32 features software that lets you create, edit, and play back MIDI files. Both boards list for $299.

—Michael Desmond

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I'm so confident in my surge protectors, I've placed high stakes on their performance. When it comes to protection, warranty and value, Curtis® beats them all.

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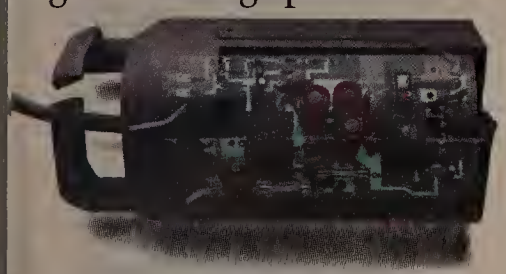

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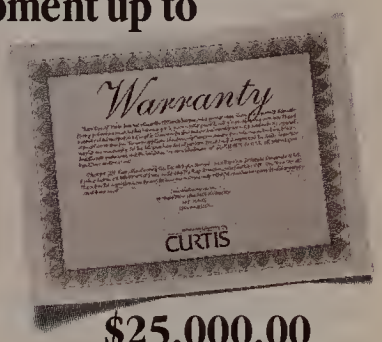
Thomas W. Judd
President of Curtis Manufacturing

Complete Warranty— We guarantee our surge protectors' performance AND **we cover your connected equipment up to**



$25,000.00
(depending on model purchased).

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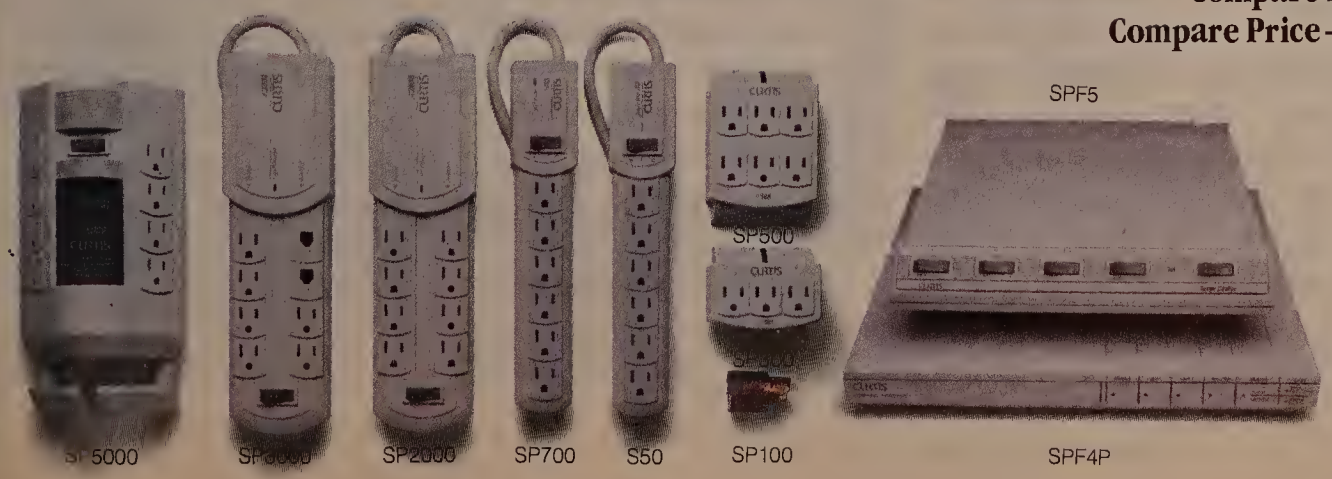
Compare Protection, Compare Warranties, Compare Price — Curtis has it all inside and out!



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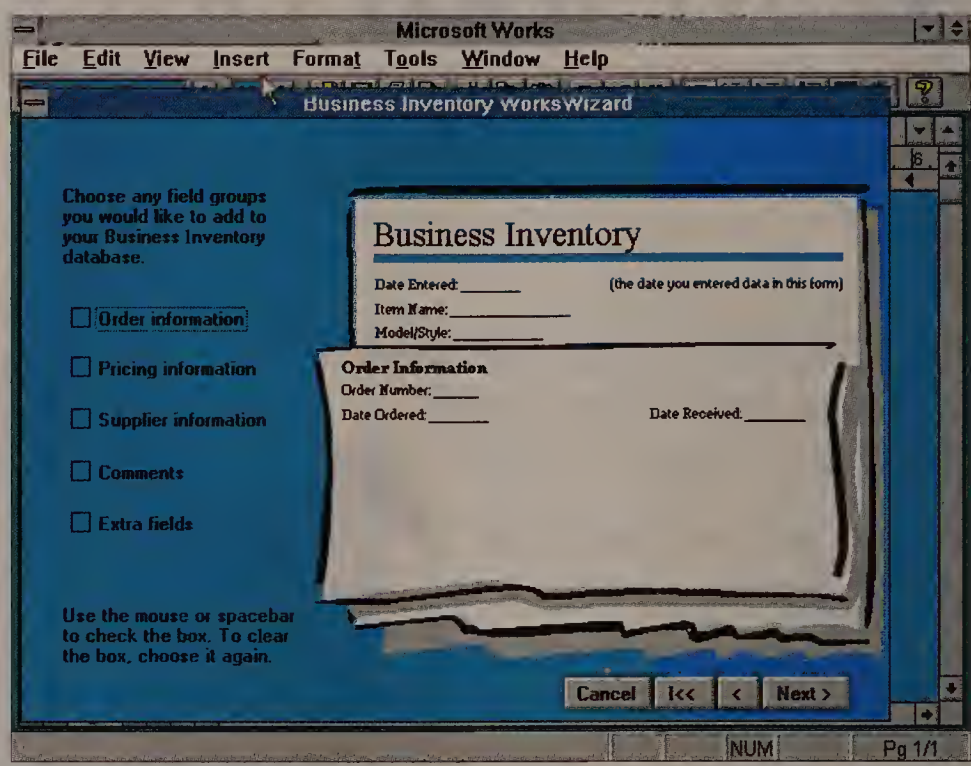
When You Want the Works: Works 3.0 and PushButton Works

Works programs, those applications that integrate basic functions at bargain prices, are particularly suited for small or home offices on a budget, as well as mobile computer users with little hard disk space. Two new entries, the $199 Microsoft Works for Windows 3.0 and the $49 PushButton Works, offer strong sets of basic tools.

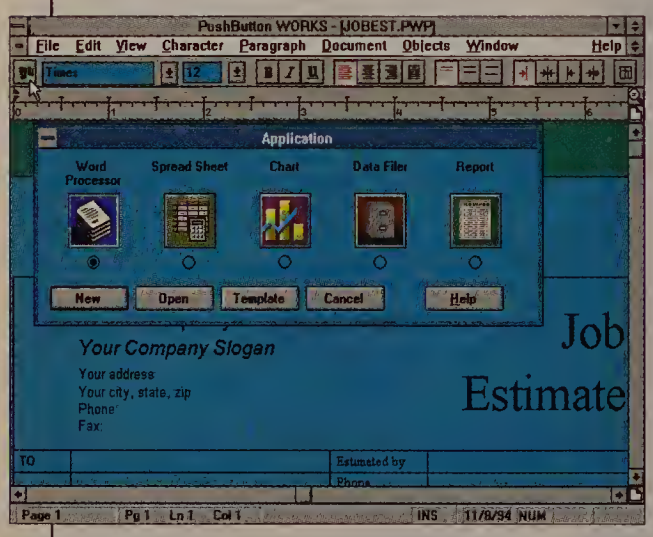
Microsoft Works provides a word processor, a spreadsheet, a database, and a new communications module, plus a few features you might not expect, like customizable tool bars. The best new feature: You can now easily create a basic newsletter with Works, thanks to support for multiple columns and text wrapping. Other helpful new features include special text effects, draw tools, 30 clip-art images, and footnotes.

The communications module is designed for beginning modem users, but it also has an auto-sensing feature that any online jockey would appreciate: The software senses your modem setup, then displays a screen with all the information you need; just add the phone number, and you'll be cruising down the information superhighway.

This version is easier to use than its predecessor, even though it incorporates some of the tools found in its more expensive sibling, Microsoft Office. For instance, Works offers cue cards—help dialog boxes that answer questions about common tasks such as mail merges. Works also now provides its own Wizards, which guide you through procedures such as setting up a simple database or creating letterhead. A series of dialog boxes prompts you for information, then the Wizard creates the document in minutes. For example, to create letterhead, I first entered my name and address in a dialog box. Then the program presented a choice of ten layouts and various styles. Microsoft Works for Windows 3.0 also comes with AutoStart templates for common business documents.



WIZARDS IN MICROSOFT WORKS lead you through common tasks such as setting up a business inventory database, making it easier to get your job done.



YOU CAN SWITCH between modules easily in PushButton Works. The program includes business templates such as this one.

However, if you are stuck traveling with an old notebook and a small hard disk, you may appreciate Works 3.0 simply because it saves space. The minimum installation takes only 4MB; the maximum, 15MB.

If saving space is your number one priority, you should also consider PushButton Works. Full installation of this product takes only 6MB. Don't let the $49 price fool you; PushButton Works provides a good collection of basic tools: word processor, spreadsheet, database, report, and chart modules. It even offers a macro engine (Microsoft Works doesn't).

I found the Lotus-like applets easy to use and practical. If you need to create a quick chart, PushButton works well. Choose from eight different chart types. The tool bar, though not customizable, features a helpful Go button for switching between modules. PushButton comes with 33 document templates, a variety of draw tools, and 110 clip-art images. The templates provide everything from preformatted business letters to basic fliers for advertising.

The only drawbacks: It does not have Wizards, and it won't let you create a newsletter that includes both text wrapping and multiple columns on the same page. We also would have liked an on-screen tutorial.

Either package would work well at home or on the road. Choose Microsoft for the most on-screen help and PushButton for the better price and the space advantage.

—Laurianne McLaughlin

Microsoft Works for Windows 3.0

This set of applications includes a word processor, a spreadsheet, and charting tools, with new support for newsletters and added ease-of-use features such as Wizards and templates.

Microsoft Corp.
800/426-9400, 206/882-8080
List price: $199
Reader service no. 630

PushButton Works

A solid, inexpensive set of basic applications in a 6MB package.

PushButton Software
508/366-6939
List price: $49
Reader service no. 631

Introducing Delrina Communications Suite. At last, powerful fax and communications software that work together.

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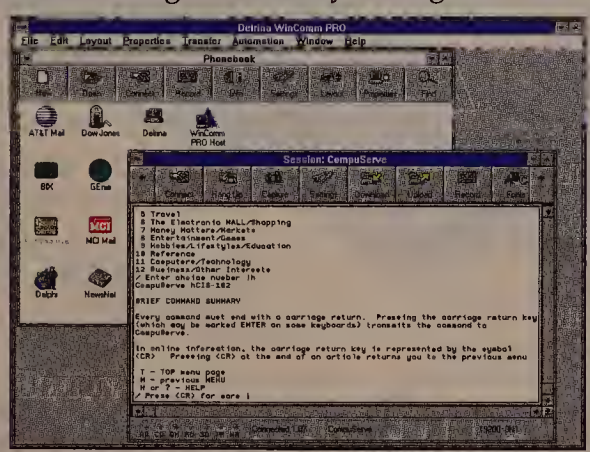
Only WinComm PRO gives you power and flexibility in data communications, with the same ease-of-use that made WinFax PRO number one in PC faxing.



Like award-winning WinFax PRO, new WinComm PRO gives you push button access to its powerful features.

WinFax PRO - the best way to send, receive and manage faxes

Plus, you get Delrina's award-winning WinFax PRO. With over 2 million copies of WinFax sold worldwide, we think you'll agree it's the best way to send faxes from any Windows application. It even lets you receive faxes in the background, organize your faxes with a detailed log, design your own cover sheets, and convert faxes into word processing documents with OCR.

PCComputing USABILITY APPROVED 1993

1993 ANNUAL WINDOWS 100 W MAGAZINE WIN AWARD 1993

PCComputing MVP FINALIST 1992

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Best of all, the Delrina Communications Suite is yours for about the same price as the leading communications software alone.

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Circle 171 on reader service card

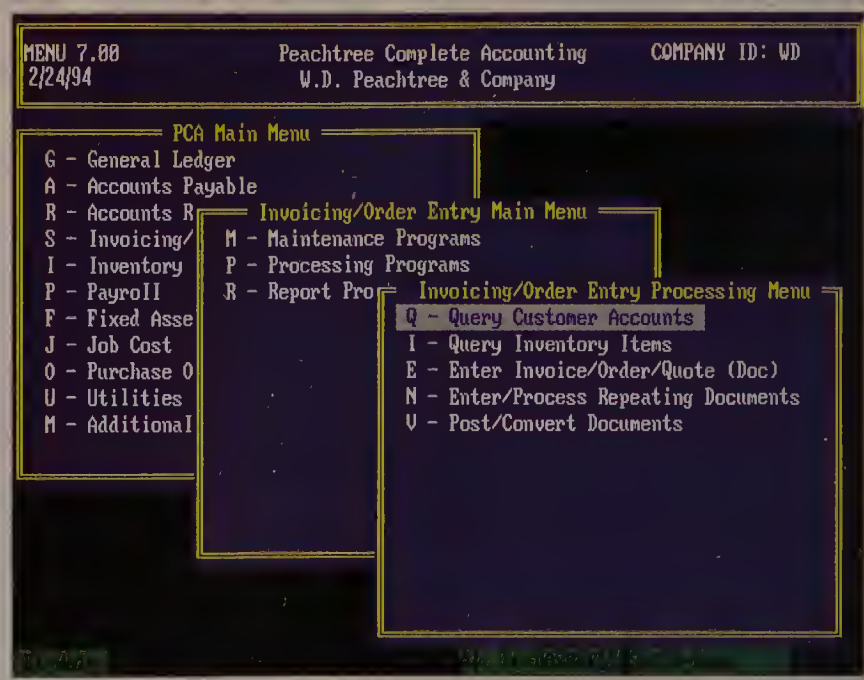
Peachtree Accounting Blooms

Version 7.0 of Peachtree Complete Accounting for DOS, one of the most popular full-featured accounting packages, contains more than 140 enhancements. Among the new features: General ledger now produces comparative monthly financial statements and contains 12 industry-specific charts-of-account templates to make setup easier. You can have an unlimited number of companies, vendors, inventory items, and employees and generate hundreds of types of standard reports. And you can customize data entry fields.

The new Order Entry feature lets you enter price quotes, orders, and customer credit information and view inventory at the time of sale. Once you enter an order, the program offers you a choice of printing one of five invoice types, as well as picking and packing slips. Quotes can be converted into orders and orders into invoices. Peachtree automatically generates back orders when appropriate.

With improvements throughout its modules, this venerable DOS package for small- to medium-size businesses has undergone a thorough and welcome face-lift. It sells for $249; a multiuser version costs $399. Upgrade pricing is $129, and the multiuser upgrade is $229.

—Joe Abernathy



ORDER ENTRY IS MADE EASY in Peachtree Complete Accounting, which lets you enter quotes, orders, and customer credit information.

Peachtree Complete Accounting 7.0 for DOS

More than 140 enhancements make this a serious upgrade to a serious product.
Peachtree Software
800/228-0068
List price: $249, upgrade $129; multiuser version $399, multiuser upgrade $229
Reader service no. 632

GREAT THINGS COME IN SMALL PACKAGES

This powerful print server can tackle your biggest network printing problems

- Connects any parallel printer directly to your Ethernet LAN
- Fully Novell Netware 286 and 386 compatible
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yes NetWare Tested and Approved

Make the Rose Connection

ROSE ELECTRONICS

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1-800-333-9343

PCW INFO HOTLINE: INSTANT FAX BACK
1-800-234-0455 ext. 145

Circle 239 on reader service card

Manage and Control Forms Across LANs

The latest version of JetForm adds forms management features that address the challenges of complex networks. At the heart of version 4.0 is JetForm Server, the central program for managing forms and data over various networks. Other critical features are modules, called Directors, that plug into JetForm and add capabilities such as global editing of forms components and attributes and automated forms tracking and analysis.

One of these modules, the Distribution Director, lets administrators automatically update their forms system, applying changes to all target documents or objects. The Director finds the forms or sections of forms, such as corporate boilerplate, that need to be changed and automatically updates all the appropriate documents systemwide—avoiding the uncertain and time-consuming process of manually updating forms locally. The Fax Director lets users transmit documents, such as purchase orders, to outside vendors while maintaining an audit trail within the forms system. The Tracking Director lets managers track documents or analyze information flow.

But administrators aren't the only ones who will notice improvements to JetForm. The new version boasts an interface that's easier to use. Among the enhancements is a Post-it note–like feature called JetNotes that lets users simply add comments on top of a form. Also new are hooks to database systems such as SQL and Open Database Connectivity (ODBC) that let you use forms to build databases. While large companies with complex databases won't want a forms-based data entry system, smaller operations can use this feature to capture information from invoices, purchase orders, and other forms.

JetForm sports an enhanced Windows-based design module called JetForm Designer that improves graphics support, with object-oriented drag-and-drop tools to save time and effort when building forms. JetForm Designer lists for $495. Filler packs are available for single users ($199), five users ($745), and 20 users ($2580). JetForm Server for Windows is available in a 5-node package for $795; a 100-node package costs $4895.

—Michael Desmond

JetForm 4.0

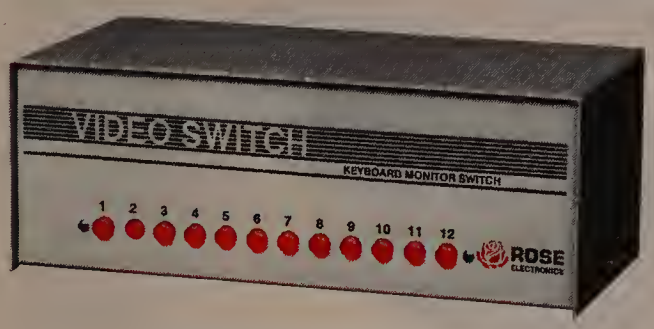
JetForm keeps its sights on the big picture with forms software that manages forms across LANs and WANs.

JetForm Corp.
617/647-7700,
617/647-4121 (fax)
List price: JetForm Designer $495; filler packs program $199; volume discounts are available
Reader service no. 635

Your Choice of Keyboard Monitor Switches

Access multiple computers with a single keyboard and monitor to cut equipment costs, save valuable space, and end clutter

yes NetWare Tested and Approved



Manually controlled unit

- Simple pushbutton operation for quick selection
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- Daisy-chaining connects unlimited number of CPUs
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- Optional keyboard booting for 286, 386, and 486
- Optional RS232 or PS/2 mouse interface
- PCB construction for high reliability and low crosstalk
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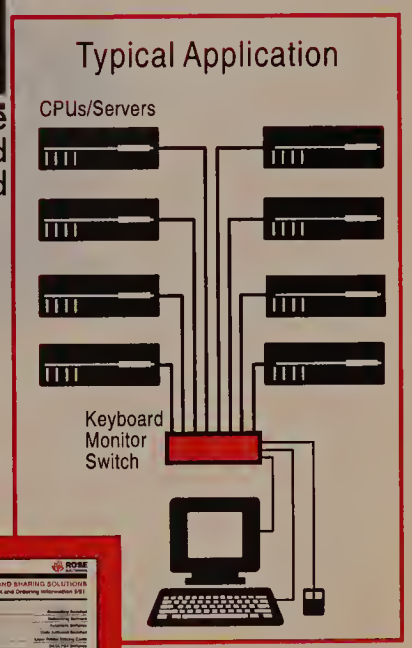

- Switch by keystroke, from front panel, or RS232 port
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Semi-pro.

HP ScanJet II CX

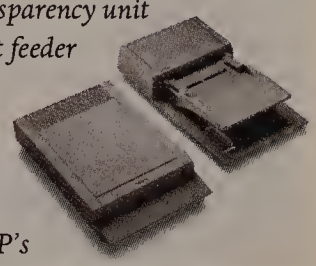
If you're a sophisticated scanner user, you shouldn't have to settle for a semi-sophisticated scanner. Not when the EPSON 800C Pro/PC has so much more to offer. More versatile controls. More powerful software. Better connections. Stronger support. More flexible options. All of which makes this 800 dpi scanner the one that will actually live up to your

*One-year warranty, extendable to two years with return of registration card, at no charge. EPSON, HP, Macintosh, and Picture Publisher are trademarks or registered trademarks of Seiko EPSON, Corp., Hewlett Packard Co, Apple Computer, Inc., and Micrografx respectively. All other trademarks are the property of their owners. ©1993 EPSON America, Inc., 20770 Madrona Ave., Torrance, CA 90503. For dealer referral or warranty details, call **800-BUY-EPSON** (800-289-3776). In Canada, call (**800**) **GO-EPSON**. For Latin America, **305-265-0092**.

Pro.

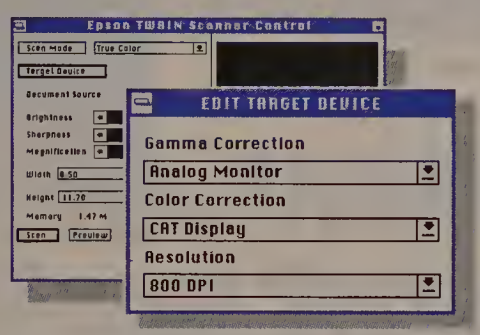
The 800C Pro/PC is solidly backed by EPSON's one-year warranty extendable to two years. HP's warranty is one year.*

The 800C Pro/PC comes with both parallel and SCSI interfaces so you can connect it to two PCs or a PC and a Mac simultaneously. The ScanJet II CX connects to one computer.



EPSON's transparency unit and document feeder are powerful options that work across every scanner in our line. HP's scanner options aren't that flexible.

The 800C Pro/PC package includes the powerful full version of Picture Publisher 4.0, the industry's top-rated image editing software for the PC. HP's software is limited.



Only EPSON has color and gamma correction settings built right into the scanner hardware.

If you need technical assistance, you can call the pros at the EPSON Connection, our toll-free help line.

The scanning pros at PC Computing were so impressed with the 800C Pro/PC, they gave it their "Best Buy" award.

EPSON 800C PRO FOR PC

exacting professional standards. For our free booklet on scanning, or more information on the 800C Pro/PC, our other scanners for PCs and Macintosh, or our full line of personal printers, call the EPSON Connection at **1-800-BUY-EPSON** (800-289-3776). And get the scanner that's in a league of its own.

EPSON®

Virtually Virtual Reality Lets You Build Your Own Worlds—Or Office

Virtus claims that it brings virtual reality into the home with Virtus VR. Well, I wouldn't go that far. But the vendor does offer a slick product at an irresistible price.

For $99, and using a standard monitor and mouse, you can walk (actually it's a little more like hurtling than walking) through several precreated scenes: Dealey Plaza—complete with John F. and Jackie Kennedy riding to his doom; the White House—complete with the Oval Office; a futuristic ocean-floor apartment; and the Hindenburg blimp (no, it doesn't explode). You can walk, float, or spin yourself silly in any one of these scenes. You can even move the furniture around in the Oval Office or change the shape of the blimp.

The product has some practical applications. For example, you can build your own "worlds" to check out, say, a new furniture layout for your living room before moving any real furniture; or you might "experience" a scene you're creating in your novel. Virtus VR comes with a gallery of objects for creating worlds, ranging from basic shapes to desks, windows, and chairs. When you drag an object out of the library and into your world, Virtus VR automatically drops it to the floor level and makes sure it's proportionally sized for that environment.

When exploring worlds, you can either record your movements to play back a particular path or try a new route every time. You can move through walls at will or turn on collision detection so that you don't find yourself out on the lawn when you only meant to glance out the window.

Additional libraries of worlds, and libraries of objects for building worlds, will be available on an ongoing basis from Virtus. Each add-on will cost $39 and provide five worlds and over 100 objects. The initial offerings are a gallery of homes, including a model of Frank Lloyd Wright's Pope-Leighey house, and a science fiction gallery, including a lunar penitentiary.

Users of Virtus VR can graduate—and take their virtual worlds with them—to Virtus's higher-level product, Virtus WalkThrough. This program is capable of much more detailed models. In fact, it was used in the development of the films *The Abyss* and *The Firm*. By creating the sets first on a computer, the directors of these films were able to decide precisely which portions of a set needed to be built by determining which angles would actually be seen by the camera. A Windows version is due early this year.

Despite all this visual wonder, the system requirements are fairly modest: You'll need at least a 386, 4MB of RAM, a VGA display, and Windows 3.1. Because Virtus VR redraws only the parts of the image that you see, it's pretty fast.

—Christina Wood

Virtus VR

Leave reality behind and put your head in your computer with a virtual reality program for every budget.

Virtus Corp.
800/847-8871,
919/467-9700
List price: $99
Reader service no. 640

VIRTUS VR allows you to create and explore virtual worlds on your computer screen—before you move the furniture in.

Borland Strikes Back

Version 4.0 of the popular Borland C++ application development environment is seeking, with some success, to regain the throne claimed by Microsoft several months ago with its introduction of Microsoft Visual C++.

The battle is being fought over object-oriented technology and visual drag-and-drop programming: Borland C++ 4.0 essentially matches Visual C++ feature for feature in these areas. New ApExpert and ClassExpert programming languages work together to generate most drudge code. Visual Basic controls also can be snapped in now, answering a similar feature in Visual C++.

Borland has greatly enhanced its ObjectWindows class library, which determines the productivity level of an object-oriented system. Now, as before, Borland's implementation of object-oriented technology is superior to that of Microsoft, notably in the support offered for C++ exception handling.

The only problem with Borland's approach is the nonstandard way it addresses Windows event handling (the model that drives Windows programs). While ObjectWindows is a fine class library, I would prefer to see Borland license the Microsoft Foundation Classes (as Symantec did) as its standard and offer the ObjectWindows library for backward compatibility and as an extension to the Classes.

—Joe Abernathy

Borland C++ 4.0

This new version makes Borland a C++ contender once again.

Borland Int'l
408/431-1000
List price: $499, upgrade $149.95, competitive upgrade $199.95
Reader service no. 639

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Windows Flowcharting: FlowChart Express and allClear

FlowChart Express for Windows, allClear for Windows

WINDOWS **FlowChart Express, for occasional use, offers an easy-to-use graphical palette; allClear, for frequent use, relies on text scripts to do the drawing for you.**

Kaetron Software Corp.
800/938-8900,
713/298-1500,
713/298-2520 (fax)
List price: $149
Reader service no. 633

Clear Software
800/338-1759,
617/965-6755
List price: $299
Reader service no. 634

Two new packages help beginners and experts alike create flowcharts easily. At $149, Kaetron Software's FlowChart Express for Windows, designed for occasional flowcharting, provides an easy-to-use drawing palette. Clear Software's more powerful $299 allClear for Windows, for frequent use, asks you to write a script from which it draws the chart.

For a simple flowchart, such as one describing a department's organizational structure, consider FlowChart Express. I found it easy to use after an hour of practice (though I would have liked an on-screen tutorial). To create a chart, you select one of 12 object shapes available from the tool bar, pick a size, and place the shape on the page grid. Then, to enter text, click on the text icon, click inside the shape, and type. To connect the shapes, click on one, then the other. If you need to move an object, the connecting line automatically redraws. Drop-down menus let you add colored lines, fill patterns, and other enhancements.

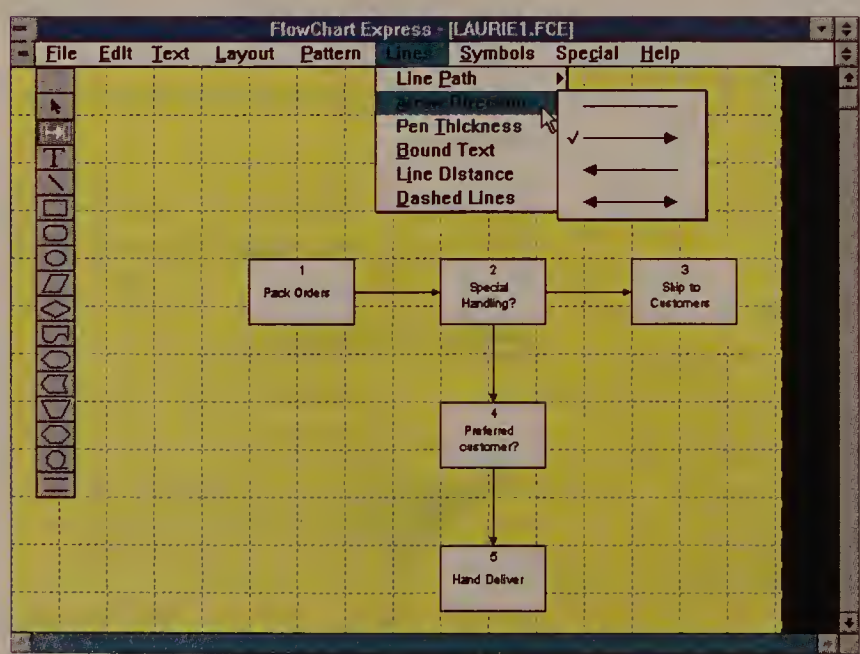
FlowChart Express offers only 12 shapes; advanced programs give you 100 or more. The software doesn't support multiple-level drawings or *off-page connectors*, a feature in multipage charts that provides reference to previous items.

If you spend a lot of time creating complex flowcharts, such as one showing procedures for a complicated manufacturing project, you'll want allClear for Windows, a remake of Clear Software's DOS program. It provides 150 shapes, multiple-level diagrams, and ready-to-use chart layouts that you can apply to your text.

Clear Software thinks a flowcharting package should draw for you. So instead of giving you a palette, allClear asks you to write a script that contains the chart's textual information separated by punctuation marks that tell the software how to render the chart. For instance, you use a colon to identify a question that poses multiple options, and a question mark to indicate a question that poses only two options. Getting the hang of writing the scripts takes time, but it's actually quite a bit easier than it sounds.

As you write, the software shows the flowchart being created, using a split screen. The drop-down Style menu lets you click to change shapes, lines, distances, and colors. A key feature of this menu, Global Styles, provides preset layouts for process charts, decision trees, and organization charts, with various artistic options—just click to select.

—Laurianne McLaughlin



GO WITH THE FLOW: FlowChart Express, designed for occasional flowcharting, provides an easy-to-use tool bar of 12 shapes.

Friendlier Project Management

Learning to use project management software can take longer than completing the project you're managing. Enter Symantec's Time Line 6.0 for Windows. This product builds on its predecessors' long list of features while making those features easier to use.

Symantec said it intends to add numerous enhancements. Among them: ODBC support for storing project information in a relational database, which will make information accessible using SQL queries from any ODBC-enabled application. The prerelease version I saw offered built-in presentations and reports including Gantt, PERT, cross tab, and calendar, as well as status, details, notes, cost, and effort.

The interface's expanded viewing capabilities provide access to projects, layouts, calendars, resources, and more by just double-clicking. Also, a customizable floating tool palette lets you choose from frequently used tools and operations.

You can start a new project quickly by using Guide Line, which presents you with a series of dialog boxes relating to a specific type of project. Check off appropriate tasks, and Guide Line creates an entire project schedule based on your answers and its knowledge base.

—Gene Smarte

Time Line 6.0 for Windows

WINDOWS **Enterprise-wide project management software stresses connectivity and ease of use.**

Symantec Corp.
800/441-7234,
408/253-9600
List price: $699, upgrade from version 1.0 for Windows or version 5.0 for DOS
$149.95, Time Line LAN upgrade per user $149
Reader service no. 636

our focus for performance and quality, is built around you!

PC WORLD BEST BUY — October 1992, November 1992

PC WORLD BEST BUY — June 1993, February 1993

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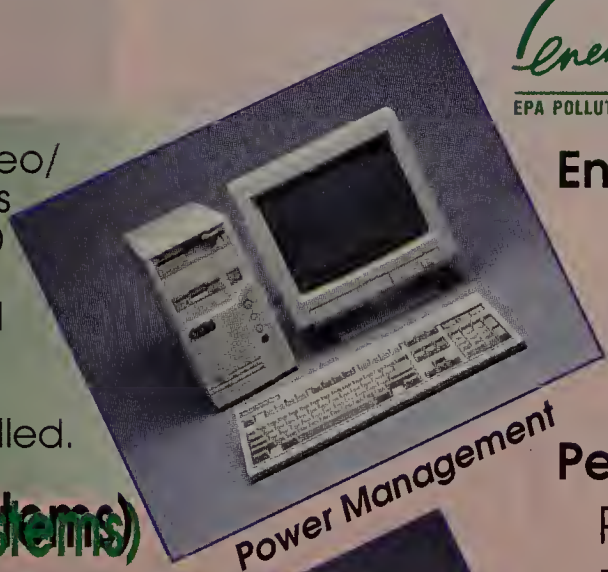
Energy Pro™ (Green Systems)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MS-DOS/Windows - On Site Warranty

Pentium Systems

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MultiMedia Power

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Oasis Shareware on CD ROM: Bargain of Bargains

Everyone loves a bargain, and this one is hard to pass up. Coyote Data is offering Oasis, a collection of 6700 shareware titles on CD ROM, as shareware. You pay $6.95 to cover the shipping and production costs of the disk; if you like it, Coyote asks you to send $24.95. Most collections of shareware programs on CD ROM are not themselves sold as shareware. For example, the PC-SIG Library 12th Edition CD ROM gives you only 3700 titles and costs $19.95 up front. With Oasis, for $6.95 you can work with the collection before you decide whether to buy it.

To help you find what you need, Oasis displays its titles by category and subcategory. You can search for a title using a keyword, such as *calendar*. When you find a title that sounds good, just copy the individual shareware program to your PC and try it out. If you intend to use the program, you then send a registration fee to the shareware author.

The Oasis collection includes clones of popular applications and covers the main software categories, including word processing, spreadsheet, database, productivity, flowcharting, and forms applications. It also offers programming languages, Windows utilities, and games. You'll find many specialized titles, such as an expense tracking and reporting database application.

Coyote updates this collection four times a year and replaces old versions, so you won't be buying dated applications. The company works with operators of local bulletin board services to acquire new titles and also has its own contributors. A year's worth of disks costs $100.

One warning: This collection includes about 20 percent Windows applications, 80 percent DOS applications. So if you hate working in DOS, your choices are much fewer.

—Laurianne McLaughlin

BROWSE CATEGORIES OR ENTER KEYWORDS to quickly search Oasis's shareware titles, which range from database apps to games.

Oasis shareware

✔SHAREWARE A collection of 6700 shareware titles on CD ROM.
Coyote Data Ltd.
800/451-7093
List price: $24.95
Reader service no. 637

Shareware CD From the Authors

There are a lot of shareware collections on CD ROM these days, and one common complaint about most of them is that the programs included are often out-of-date versions, sometimes distributed without the permission of those who wrote them. The Association of Shareware Professionals (ASP), a professional organization of shareware authors, has provided a solution: the ASP Advantage CD ROM.

With the Advantage CD ROM, you're unlikely to get software that's significantly out-of-date. According to the ASP, the authors of the more than 600 programs included keep the organization supplied with their latest versions. Since the ASP plans to release updates of the CD ROM quarterly, no programs can be more than three months out-of-date when the CD ROM ships.

And what are some of the programs included? From the DOS-based but easy-to-use menuing program, I was able to find appointment calendars, a quote-bidding system, label makers, a survey analysis tool, 17 communications programs, a scrolling tape calculator, a grammar checker, WinZip and Drag and Zip (see *Quick Takes*), 51 games, and the ZPay payroll system described in "The Best of Business Shareware." There are also essays on common virus myths and the history of shareware (did you know that the concept was created by *PC World*'s founding editor, Andrew Fluegelman?). And when I wanted to look at a program, the ASP Advantage software decompressed it for me.

ASP members must meet certain standards of conduct when dealing with their customers and potential customers—and that's a guarantee of quality for you. They must distribute full working copies of their programs, with adequate documentation. Members are also required to give technical support to registered users and provide a means for users to report bugs.

Remember, however, that when you buy the ASP Advantage CD ROM, you're not actually buying the programs that come on it. If you like a program enough to continue using it, you must send in a registration fee to the original author.

—Lincoln Spector

ASP Advantage CD ROM

Another collection of shareware programs on CD ROM, only this one is put out by the authors' own organization.
Association of Shareware Professionals
616/788-5131,
616/788-2765 (fax)
Price: $24.95 via mail order through ASP
Reader service no. 638

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Reduce Travel, Improve Communications With These Conferencing Tools

As someone who telecommutes to work every day, I should be the first to jump at the idea of video conferencing and related PC-based technologies. The idea is simple and appealing: Replace face-to-face meetings with virtual ones.

It can work, too, but it's expensive and requires changes in both corporate procedure and meeting etiquette to be effective—and these changes can be difficult to put into play.

The main drawback to live video conferencing is that it demands specialized hardware and may also require dedicated, high-capacity telephone lines.

Beginning at $249, Eyetel Communicator for Windows lets you exchange text and image files between PCs. It uses standard phone lines, and you can view files simultaneously, mark them up, and type comments into a "chat box." You can enhance the experience by adding a video capture board to accept still images from VCRs and the like; a voice-over-data modem for adding live conversations to your data transmission using one standard phone line; and a live video capture board for full-motion video. Pricing goes up to $15,000.

The Meeting Room by Eden Systems uses a refined text-only approach. The LAN-based product seeks to replicate the intellectual process of a meeting, with tools for organizing thoughts and people. You can assign tasks, conduct votes, and hold secondary and private conversations away from the main topics. Pricing begins at $895 for a ten-user package.

Vtel offers a line of high-end products that include video and interactive computer technology. Using either a mouse or a touchpad, you can control the picture-in-picture images on your screen, pan the local camera to give remote viewers a glimpse of who's in the room (video conferencing etiquette), and work with documents interactively. It's good technology, but the price is breathtaking. In addition, all of Vtel's offerings require at least a 56-kbps data line, and most require a T1 line.

The Vtel 115 system has all you need for personal video conferencing, for a price beginning at $14,950. The Vtel 127 system starts at $19,500. Prices go up to $75,000.

—Joe Abernathy

Eyetel Communicator, The Meeting Room, Vtel video conferencing line

Three video conferencing applications to improve meetings with off-site staff and clients.

Eyetel Technologies
219/457-8200
List price: $249 to $15,000
Reader service no. 624

Eden Systems Corp.
800/288-9510, 317/848-9600
List price: $895 for ten users
Reader service no. 625

Vtel Corp.
512/314-2700
List price: $14,950 to $75,000
Reader service no. 626

Delrina Combines Fax and Communications Software

Delrina Communications Suite for Windows combines two solid programs into one low-priced bundle. For $179, you get WinFax Pro, which lists separately for $129 and is one of our perennial favorites, and WinComm Pro, which is based on technology from Hilgraeve's $199 HyperAccess for Windows, a *PC World* Best Buy in the November 1993 issue.

WinComm Pro includes some of the best features of HyperAccess, such as its fast proprietary file transfer protocol and virus scanning, and corrects one of its key drawbacks—the frilly, confusing interface. We found the program easy to set up and use. Within minutes we were checking our MCI mail with the help of a predefined log-on script that even includes the MCI phone number. The program also comes with all the communications basics, such as support for popular file transfer protocols and terminal emulations.

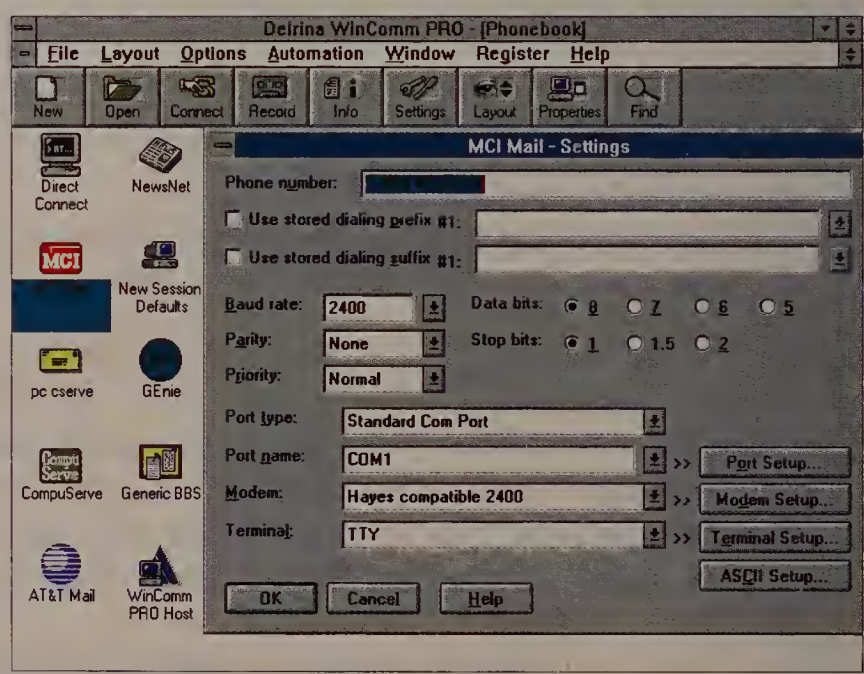
The suite includes some limited integration features. For example, a menu selection lets you fire up WinFax Pro from inside WinComm Pro. The suite can also share a fax-modem.

—Randy Ross

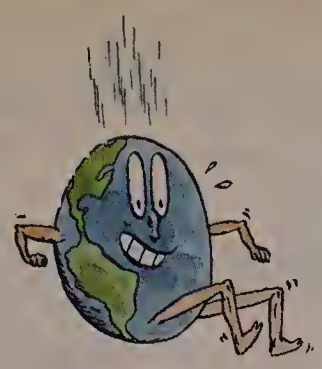
Delrina Communications Suite for Windows

WINDOWS This economical package includes a top-selling fax program and a solid communications program.

Delrina
800/268-6082
List price: $179, for users of communications programs or WinFax Lite $69
Reader service no. 627



WINCOMM PRO'S SETTINGS DIALOG BOX saves time and reduces confusion by letting you adjust communications, modem, port, and terminal settings from a single dialog box.



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Circle 49 on reader service card

Desk Clutter Away With PaperMax Scanner/Software Bundle

Have you forgotten what the top of your desk looks like? If your work space is cluttered with piles of memos, faxes, and assorted business documents, you should consider PaperMax, a Windows-based document manager from start-up Visioneer.

Unlike complex and expensive LAN-based document managers, PaperMax is designed for a single-user PC. Consisting of a compact desktop scanner and Windows software, PaperMax lets you quickly scan in documents such as handwritten notes, business cards, contracts, and paper faxes. You can then highlight or annotate portions of a document, save it as an image file, convert it to text using OCR software, print it, or fax it (provided you have fax software and a fax-modem).

Setting up PaperMax is easy: Connect the scanner to a serial port and an AC outlet, install the MaxMate for Windows software, and you're ready to scan. PaperMax accepts document sizes ranging from business card to standard letter and legal. It's fast, too: I inserted a motley collection of faxes, business cards, and other pages into PaperMax and it scanned each document in less than 5 seconds. The PaperMax scanner stands upright and is roughly the size of a portable printer. It fits nicely between the keyboard and computer.

Once the scanning is complete, the MaxMate software pops up with the scanned document on screen. You can annotate the document or highlight portions in yellow (as with a yellow highlighting pen). Also, you can save images in a variety of file formats, including MAX (MaxMate's proprietary format), PCX, BMP, PICT, and TIFF. MaxMate enables you to create multipage documents called stacks. Simply drag one image on top of another, then use your mouse to point and click your way through each page in the stack. You can rearrange these pages or easily unstack documents by clicking the Unstack All icon.

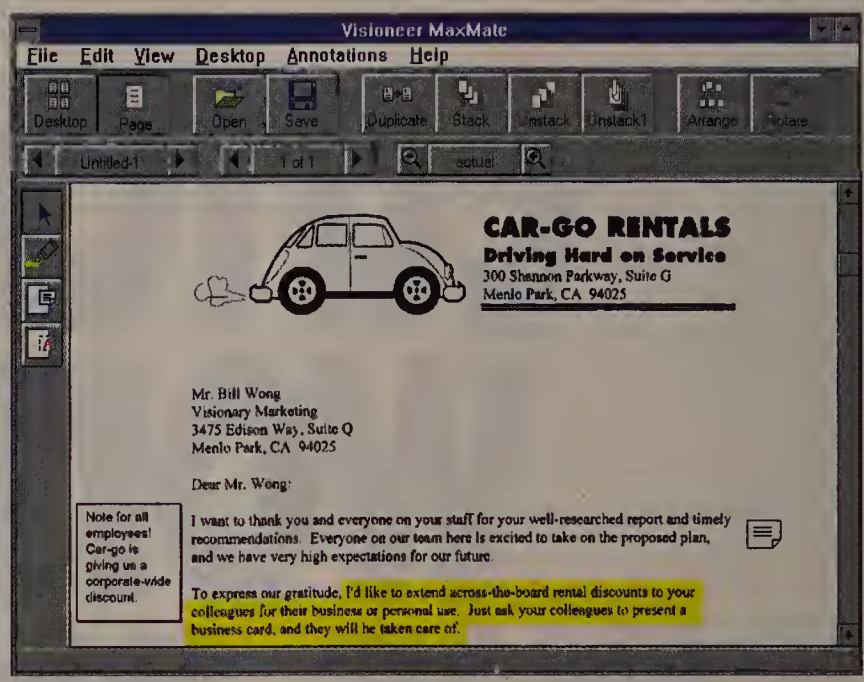
PaperMax integrates nicely with popular Windows E-mail, fax, and OCR software, including Lotus cc:Mail, Microsoft Mail, Intel's Faxability, Delrina's WinFax Pro, and Calera's WordScan. For instance, by simply choosing Send from the File menu, WinFax users can send a fax directly from PaperMax. Similarly, WordScan users can convert a PaperMax image to text using an OCR command added to the File menu.

While PaperMax is useful for scanning simple black-and-white documents, it's not designed to replace sophisticated desktop scanners. It doesn't support color and scans at a maximum resolution of 200 dpi—a far cry from today's 24-bit color, 400-dpi desktop models priced around $1000. But then, at $499 list, PaperMax costs a lot less.

—Jeff Bertolucci

PaperMax

A fast and easy document management system.
Visioneer
800/787-7007,
415/812-6400,
415/855-9750 (fax)
List price: $499
Reader service no. 628



VISIONEER'S MAXMATE works with the PaperMax scanner. You can add comments, highlight text, and save the documents as images.

File Sharing Through the Air

LapLink is a convenient way to transfer files between two PCs—but nobody likes to mess with serial cables and the labyrinth of wires behind a computer. Now Traveling Software, maker of LapLink, has teamed up with National Semiconductor to introduce LapLink Wireless With AirShare, an integrated hardware-software product that uses radio technology to transfer files and synchronize data. It's easy to use: Just wave your notebook in front of your PC and LapLink takes care of synchronization.

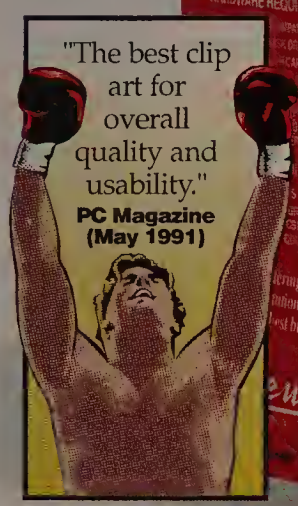
The $299.95 LapLink Wireless With AirShare includes LapLink Remote Access software and two AirShare radio modules from National Semiconductor. Measuring just 2¼ inches wide, 3½ inches long, and ½ inch thick, each AirShare module includes a cable that connects to the serial port. The module includes a connector that draws power from your PC's mouse port, or you can use an AC/DC plug-in power pack.

LapLink Wireless With AirShare works within a radius of 30 feet, according to the companies. It's useful for business travelers who want to transfer or synchronize files between their notebook and desktop PCs. The product can transfer data at speeds up to 115 kbps, depending on the PC's serial port, many of which are incapable of speeds over 20 kbps.

—Jeff Bertolucci

LapLink Wireless With AirShare

Traveling Software's LapLink now transfers files via National Semiconductor's AirShare wireless radio modules.
Traveling Software Inc.
800/343-8080,
206/483-8088
List price: $299.95
Reader service no. 629



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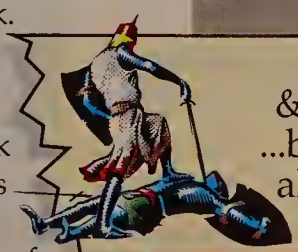

"Outstanding value & excellent art to boot! ...by far the best value of all the clip art libraries we reviewed."

PC Computing (May 1992)

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Edited by Jeff Bertolucci

Quick Restart for Windows and DOS

WINDOWS If you're annoyed by the time lag between turning on your computer and having all your applications up and running, you may want to consider Quick Restart for Windows and DOS. Like Binar Graphics' Fantastic Recall, PowerPro Software's Quick Restart saves the contents of RAM to disk before you shut off your computer. Rather than relying on your CONFIG.SYS and AUTOEXEC.BAT files to reload TSRs, device drivers, Windows, and Windows apps when you return to work, you can have Quick Restart restore everything to the way it was when you left it. PowerPro estimates that Quick Restart saves 8MB of RAM on a 386 or 486 in about 12 seconds and restores it in approximately the same amount of time. Quick Restart retails for $79.95. PowerPro Software, 415/345-9278, 415/345-5128 (fax).

Reader service no. 611

Value Vision

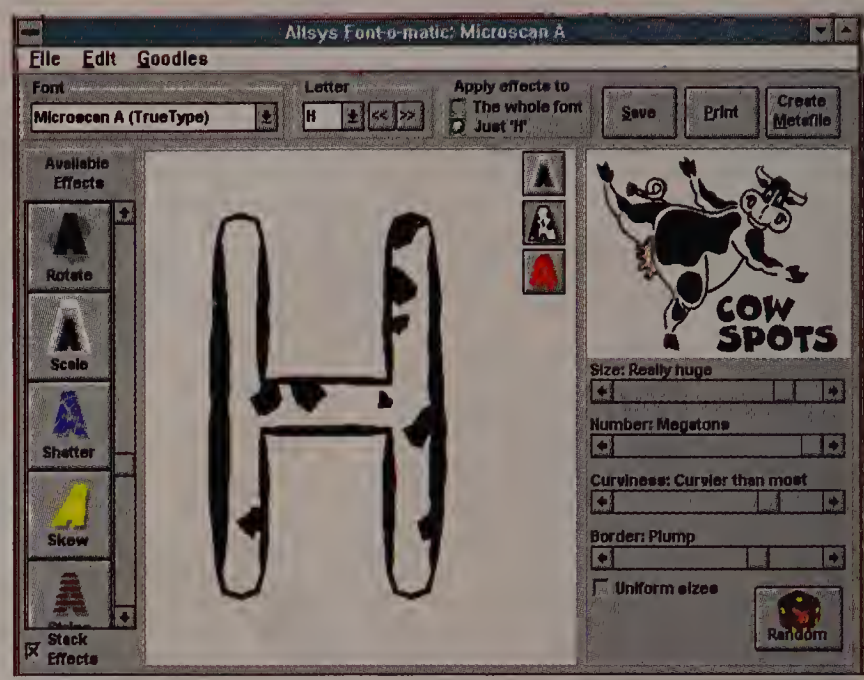
WINDOWS Are you sure it's insured? Of course—you're no dummy. But are you sure you'd remember if it suddenly disappeared? That's the question asked, and fairly capably answered, by an inventory program called Value Vision. Directed at the small-office/home-office market, this $99 package lets you design a floor plan and then take inventory by dropping icons representing your belongings into the rooms in the floor plan. It's easy and even kind of fun—and when you're done you have a complete inventory of your possessions and their value, along with information for an insurance claim in the event of a disaster. Value Vision guides you through the process of recording a loss. It also generates a claim form and guides you in recording the details of a claim settlement. (Just hope the computer containing your Value Vision data is not part of your claim.) Fusion Software, 800/856-8566, 713/465-9721, 713/465-9749 (fax).

Reader service no. 613

Font-o-matic

WINDOWS A font program with an attitude, Font-o-matic lets you create typefaces that would make Gutenberg turn in his grave. Start with an existing TrueType or PostScript font, then click a few buttons to add, say, cow spots or cactus spikes or to apply a mangle or warp effect to one or more characters. Handy sliders let you control the size, number, and shape of the effects, and you can even stack effects to end up with, say, a striped, rotated, Swiss cheese font. Once a font suits your fancy, Font-o-matic saves it in TrueType format and installs it so that it's accessible from any Windows application. The program is a lot of fun for $59.95. Altsys Corp., 800/477-2131.

Reader service no. 612



FONT FRENZY: A Font-o-matic cow/mangle font can be just the ticket for injecting some fun into a newsletter or a mailing.

Graphics Ultra Pro for Micro Channel

Even OS/2 can be made to perform at a reasonable pace with the new Micro Channel version of ATI Technologies' popular Graphics Ultra Pro video card. With 2MB of RAM, the card provides noninterlaced graphics at up to 1280 by 1024 resolution at 74 Hz, with drivers for AutoCAD, Windows, and OS/2. It also produces 16.8 million colors at 800 by 600 resolution, 65,536 colors at 1024 by 768, and 256 colors at 1280 by 1024. ATI's Crystal Font Engine smooths the edges of TrueType and PostScript fonts. A control panel application lets you reset screen resolution within Windows; Windows must be restarted for the changes to take effect. The card lists for $549. ATI Technologies Inc., 905/882-2600.

Reader service no. 616

Inex 4000 Series Notebooks

These high-end notebooks offer a range of upgrade options and include built-in audio features such as an ESS488 Audio Drive sound chip, a built-in microphone, and a speaker. When used with Windows 3.1 sound drivers, the systems let you store and retrieve voice messages and add sound to presentations. The module encasing the dual PCMCIA Type II slots pops out and can be replaced with proprietary modules for connecting to the office LAN or to other external devices. For instance, a cellular fax-modem that accepts conventional and cellular calls and allows the notebook to act as an answering machine is expected to ship in January for $499. The 4000 Series ranges from a 25-MHz 486SX-based monochrome system for $2195 to a 66-MHz 486DX2 with active-matrix color for $5695. Inex Technologies, 800/783-4639.

Reader service no. 615

WillMaker 5.0

WINDOWS Face it: You could go at any time. And what will happen to your property—or your children—if you die without leaving a will? WillMaker 5.0 is an easy, inexpensive way to take care of this unpleasant task. An upgrade from DOS-based WillMaker 4.0, this new Windows version allows for more than one user and up to 100 bequests. The program walks you through the process with an interview that assumes no computer skill or legal knowledge. Written by lawyers and put out by the legal-book publisher Nolo Press, WillMaker 5.0 asks you the appropriate questions and offers legal advice. The program even tells you what not to do, such as insisting that a relative perform some task in order to inherit money (this requirement can delay the legal process). Will-

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Maker 5.0 lists for $69.95. Nolo Press, 800/992-6656, 510/549-1976, 510/548-5902 (fax).

Reader service no. 614

WinZip 5.0, Drag and Zip 3.0

WINDOWS ☑ SHAREWARE

These two shareware utilities for working with compressed files are significantly improved. The most impressive change: WinZip now features built-in compression and decompression features, so you don't need to buy PKWare's PKZip and PKUnzip. WinZip 5.0 also provides drag-and-drop support for viewing, running, extracting, and testing files. The $29 program also now works with LZH, ARJ, and ARC files. Nico Mak Computing Inc., Public Software Library, 800/242-4775.

Reader service no. 617

Drag and Zip 3.0 offers many of WinZip's features but still requires PKZip and PKUnzip. The program now includes a "check out" facility that lets you put extracted files into a group to examine, run, save, or delete them (WinZip has the same feature). Version 3.0 also supports virus scanning and LZH files. It costs $25. Canyon Software, 415/382-7999, 415/382-7998 (fax).

Reader service no. 618

Citizen Notebook Printer II

Citizen's new printer is small enough to carry home or take on the road. At 11.7 by 4.1 by 2 inches, the 2.6-pound $399 Citizen Notebook Printer II is smaller than a folded newspaper. It prints at 2 pages per minute on plain paper and transparencies using snap-in black-and-white and color cassette ribbons. The ribbons, sold separately, each cost $4.99 (black and white) and $6.99 (color). With an optional battery pack ($69), the printer produces 30 to 50 pages, the vendor claims. The battery recharges in 3 hours. A standard AC adapter is included; a car charger/adapter costs $49. The printer lists for $399. Citizen America Corp., 310/453-0614.

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WriteType

WINDOWS Want to impart a personal touch to your correspondence? Now you can get a typeface created from your own handwriting. For $349.95, Signature Software will supply you with a full set of upper- and lowercase letters, your signature, and two symbol characters of your choice. WriteType is context sensitive: It varies letter shapes and connections just as they vary in actual handwriting. And if you like the idea of a handwritten font but don't like your own penmanship, you can get PenFont—which gives you the handwriting you wish you had—for $99.95. Both WriteType and PenFont are TrueType fonts that will work in any Windows 3.1 application, though they require a PostScript printer or interpreter in order to print in cursive format. Signature Software, 800/925-8840, 503/386-3221.

Reader service no. 620

SafetyPlanBuilder

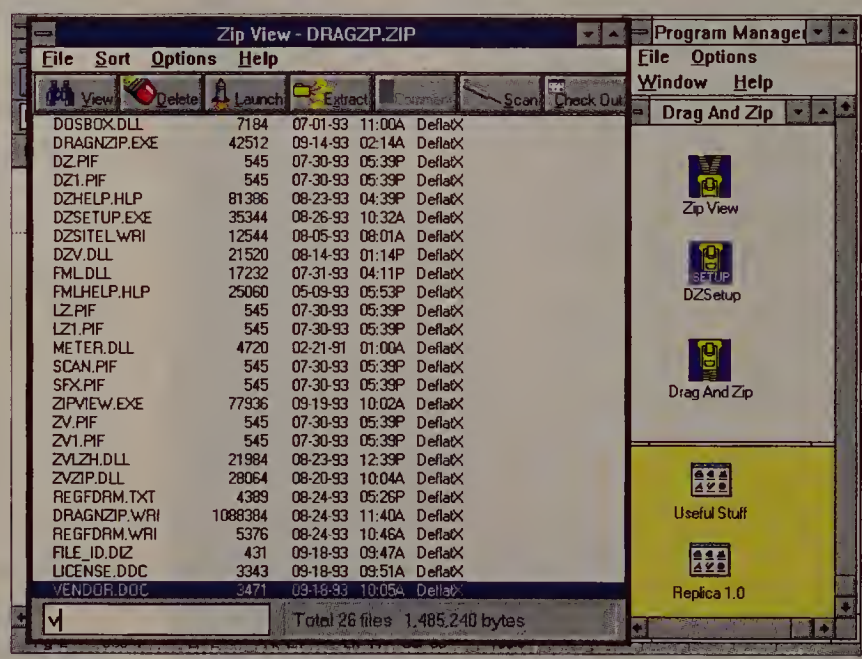
SafetyPlanBuilder enables you to build a complete safety plan and employee manual in less than a day, potentially saving lives and preventing lawsuits. Based on California's law requiring every business to have a written safety plan, this DOS program was designed by the Thierman Law Partnership in San Francisco. A manual and set of sample documents show you what to expect in an encounter with the Occupational Safety and Health Administration and how to minimize risk in any such encounter. A database includes the complete federal and state safety regulations and a number of additional state processes. SafetyPlanBuilder lists for $139. Jian Tools for Sales, 800/346-5426.

Reader service no. 621

FastLynx 3.0

WINDOWS FastLynx 3.0 narrows the gap between simple PC-to-PC file transfer and more complex and expensive networking. This major update of Rupp Technology's file transfer utility adds a Windows interface, mouse support for the DOS interface, more options for tagging files, and support for background file transfers. FastLynx 3.0 can determine which files need to be transferred to synchronize drives or directories on two connected systems. The program lists for $169.95. Rupp Technology, 800/844-7775, 602/224-9922, 602/224-0898 (fax).

Reader service no. 623



DRAG AND ZIP 3.0, a $25 Windows utility that lets you view and manage compressed files, now supports virus scanning.

CursorPower, LinkRight

OS/2 2.1 users get two new utilities: CursorPower and LinkRight. The $49.95 CursorPower lets you resize or redesign the arrow, hourglass, and other cursors in OS/2 2.1 and Windows 3.1 (CursorPower works under OS/2 and Windows; both versions come on one disk). This utility is handy for use with monochrome screens, where a small cursor can easily vanish. North Shore Systems Inc., 702/831-1108.

Reader service no. 624

LinkRight, a file transfer utility for OS/2, works similarly to LapLink. It lets you transfer files between two PCs using a parallel-to-parallel or serial-to-serial cable link. LinkRight includes versions for Presentation Manager, the OS/2 command line, and DOS (for transferring files between an OS/2 PC and a DOS PC). It's compatible with LapLink cables and can be purchased with a cable ($149) or without ($99). RightWare Inc., 301/762-1151.

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Thank you, Gateway customers everywhere, for your support in 1993. As you can see by the number of major industry awards we received, it was another banner year for Gateway 2000. And we owe this success to you. Our most treasured honors are the "Readers' Choice" awards that come from PC users. The majority of our awards are this variety, which is why we feel so fortunate this year.

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Most Valuable Peripheral Award, *PC/Computing*, Dec. '92

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T. Yager, *Byte*, Dec. '92

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D. English, *Compute*, Jan. '93

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PC WORLD TOP 20
1 POWER DESKTOP

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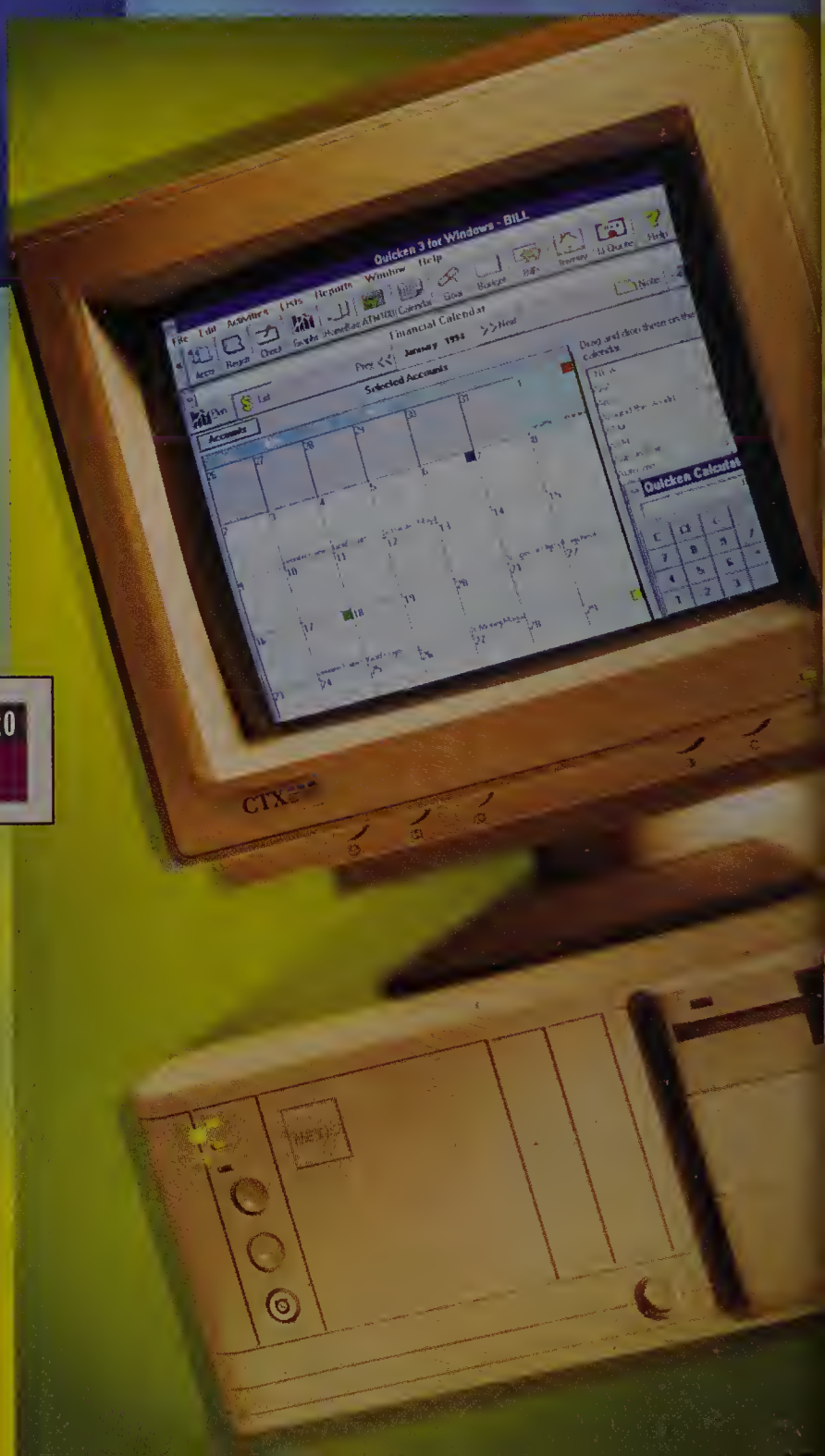


THE NETIS N433VL is a fast 486DX-33 system that's rigged to run business applications and boasts a great price.

PC WORLD TOP 20
1 BUDGET DESKTOP

The PC World TOP 20

We put close to 80 PCs—from 486SX-25s to Pentiums, priced from $1439 and up—through our revamped performance tests. We factored in their price and service and support. In this month's debut of our new Top 20 Power and Budget PCs, which systems hit the top of the charts?

By Bryan Hastings

Faithful readers will see bold changes in *PC World* system reviews, starting this month. In order to bring you the most current information on new systems, we not only have adjusted our focus to cover only the very latest systems to hit the market, but we also look at them in the context of all machines on sale. Our research tells us that *PC World* readers have two main questions when it comes to buying a computer: How much does it cost, and how well does it perform?

Our new format addresses these issues. Every month we'll bring you the Top 20 Budget and Power Desktop systems, highlighting the top 5 systems in both categories as Best Buys. We'll test all the new and currently available systems we can lay our hands on—nearly 80 for this review—to create a database against which we can compare all new systems in a roundup. Each month we'll add data about newly reviewed systems to the database, reprice all the systems involved, and eliminate machines that are no longer sold. Review after review, we will tell you which are the best machines on the market—not just the best we looked at this month. For example, only 3 systems from this month's harvest of 25 machines make it into the Best Buy ranks. The Netis N 466

PC WORLD TOP 20
This Month's Contenders pg. 109
Power Desktops pg. 110
Budget Desktops pg. 114

Testing by Ulrike Diehlmann and Susan Silvius; research and support by Gary VanDerHorn

ROBERT CARDIN

VL Power Station and the IBM PS/1 Consultant DX2-66 are Budget System Best Buys, and the Zeos 486DX2-66 is in the Power Desktop top 5. All the other Best Buys this month were reviewed in either December or January.

New Test Suite

We have also created a new test suite to reflect our readers' steady migration away from DOS and to measure real-life performance more accurately. To our current suite of three Windows applications (Word for Windows, Excel, and Freelance) and one DOS application (Paradox for DOS running in a DOS window), we have added Paradox for Windows 1.0, Word Perfect 6.0 for DOS, and 1-2-3 release 3.4 for DOS. The Word Perfect 6.0 and 1-2-3 2.4 test scripts run in DOS rather than in a DOS window.

System Shopping

While our review format evolves, the basic features that you need to look for in a system don't change. We rate systems according to the same four criteria as before: price, performance, expandability, and service and support.

Review after review, we will tell you which are the best of all the machines on the market–not just the best we looked at this month.

The single most important determinant of power is the processor. It comes as no surprise the only Pentium-based system we review this month—AST's Premmia LX P/60—is the speediest of the February contenders. The 486DX2-66–based PCs fill the next 18 performance spots this month, while DX-33s bring up the rear. We compare each of these systems to a composite median system—a typical DX2-66 with 8MB of RAM and 256K of secondary cache and costing $2880.

The CPU doesn't tell the whole story, however. The amount of system memory and secondary cache also figure prominently in how fast a system will compute. We recommend at least 8MB of RAM and 64K of secondary cache for comfortable Windows operation. Disk and video subsystems also affect overall performance. Video memory is an important component of graphics adapters—most boards come with a minimum 1MB of video RAM. The more memory a board has, the higher the resolution it can display and the more colors it can show simultaneously.

A system's value lies not only in what it can do as is but in how much and how easily you can enhance it. Drive bays, expansion slots, and RAM are all of prime concern. Virtually all desktops these days come with two to eight single in-line memory module (SIMM) sockets, which hold small RAM modules. We place a premium on the newer sockets for 72-pin SIMMs, which allow greater flexibility in upgrading than do sockets for 30-pin SIMMs.

Who You Gonna Call?

Finally, a factor that can be the key to your happiness as a computer user—service and support. Many a buyer has found a great deal on a PC, only to encounter a hard time getting help when the system goes down. A one-year warranty has become the minimum, with two- and three-year policies popping up more often, and it's a rare company these days that doesn't offer a money-back guarantee. The same is true for on-site service. In fact, over half the companies listed in this review include free on-site service for the first year of ownership. Full-time tech support is also more prevalent; over a quarter of the companies represented here offer around-the-clock tech support seven days a week. In addition to listing service policies, we make three anonymous calls to each company's tech support department and rank it on how quickly and accurately it responds to our test questions.

What's New on Your Desktop

Two features are still so new that many of you will be unfamiliar with them. Several systems last month had both, but they still bear some mention here.

One is the PCI local bus. Unlike the VESA local bus, which was designed for the 486, PCI is processor independent, so it can also work with RISC and other non-86 CPUs. Our sole Pentium-based entry this month, AST's Premmia LX P/60, comes with PCI local bus slots; so does DEC's DX2-66 entry, the DECpc XL 466d2.

The other new feature is compliance with Energy Star, a program developed jointly by the Environmental Protection Agency and the computer industry to promote energy efficiency in computers, monitors, and printers.

Several of this month's systems—Axik's Ace Cache, Dell's NetPlex 433/P, and IBM PS/1 Consultant DX2-66—adhere to the Energy Star guidelines. Like many notebook computers, these desktops "go to sleep" after a period of inactivity, drawing only a fraction of their normal operating power, and can be brought back up to speed in just moments.

How to Read the Top 20 Tables

The Overall rating is a normalized average on a scale of 1 to 100 generated from rankings we make of performance, price, service and support, expandability, and design. With Power systems, performance receives the most weight and price the least. With Budget systems, price is given the most weight.

The Performance rating is a normalized average based on a scale that weights test results according to each application category's level of usage among *PC World* readers. The Service rating is based on a combination of a company's support policies and its responses to our anonymous calls.

Bryan Hastings is an associate editor for PC World. *He can be reached on PC World Online (see page 12 for contact information).* PC World *staff members Michael Desmond, Rex Farrance, John Goddard, Anita Hamilton, Caroline Jones, Owen Linderholm, and Susan Silvius also contributed to this article.*

To receive a fax reprint of a month's complete system review, call 800/234-0455 extension 365 and enter the corresponding fax reprint number: December 1993, 3012; January 1994, 3001; February 1994, 3002. Then enter your own fax number. Touch-tone phone required.

For more information about all products in this article, circle reader service no. 905.

This Month's Contenders

Our look at this month's contenders for the Top 20 Power Desktops and Budget Desktops. Icons show where systems placed on the Top 20 charts.

AcerPower Series 9000 DX2-66

PC WORLD TOP 20 7 POWER DESKTOP

PROS: Hot performance, good service and support
CONS: High price, single-speed CD ROM drive

The AcerPower Series 9000 DX2-66 is an outstanding performer. It outpaced every other DX2-66 system in this month's review, finishing behind only the Pentium-based AST Premmia in overall performance. Bottom line? This is one of the fastest 486s we've ever tested, easily outpacing our median system.

While the $4794 direct price is steep for a 486DX2-66, you get a fully loaded system with an ample 16MB of RAM expandable to 64MB, and 256K of secondary cache expandable to a full 1MB. Furthermore, Acer provides a sizable 520MB SCSI hard disk. And the CPU and secondary cache sit on a plug-in module that will allow an upgrade to true Pentium—albeit with 32-bit memory, not 64-bit. You also get two VL bus slots (one free) and six free EISA slots.

AcerPower

The video subsystem is excellent. It includes a sharp 17-inch AcerView 76i monitor and a 2MB Acer L45 graphics accelerator, powered by ATI's powerful ATI 68800 chip, enough for advanced graphics applications. Rounding out the package is an internal SCSI CD ROM drive. Unfortunately, it is based on older single-speed technology.

Drive expandability is limited, with just a pair of free 5¼-inch externally accessible bays. And Acer filled all four 72-pin SIMM sockets in our system, meaning that users would have to discard RAM to perform a memory upgrade. When it comes to service, Acer does well, offering 24-hour toll-free telephone support and a three-day turnaround on factory repairs. We experienced only short waits on hold and got perfect answers to all our questions.

The Acer is a high-performance, generally solid machine. First-rate performance, good service, and impressive hardware earn it 7th place on this month's Top 20 Power Desktops list. Keep in mind, however, that the AcerPower costs as much as more powerful Pentium PCs. *Acer America, 800/733-2237* **Reader service no. 798**

AST Bravo MT 466d

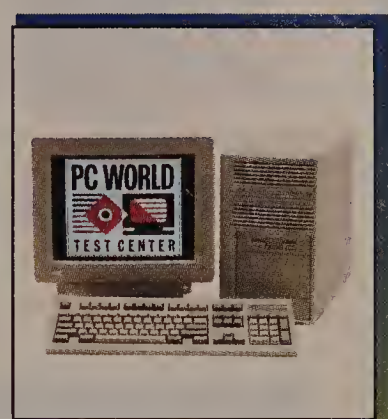
PROS: Good service and support
CONS: Smallish hard drive

AST's low-cost Bravos were among the first value-priced personal computer lines. The latest addition to the Bravo family slips slightly from the penny-pinching tradition with a powerful 486DX2-66 PC at a more ordinary $2800 street price. While AST cut a few corners on this bargain PC, many users will hardly notice as they enjoy the Bravo's quick performance and solid support.

Scores from the *PC World* application suite place this minitower firmly in the middle of this month's 486DX2-66 systems. Its relatively small 64K secondary cache may have kept it out of the top speed slots this month, but power users can upgrade to 256K. And the Bravo comes with 8MB of RAM, enough for most business use.

The Bravo also has a 15-inch monitor that supports flicker-free displays at 1024 by 768 resolution. The integrated 1MB ATI Mach 32 controller is more than adequate for most business applications.

So where did AST trim costs? One obvious place is the 170MB hard drive—small even for a budget DX2-66. And the Bravo MT 466d lacks local bus slots, a common feature today on new computers. General expandability is very good—six free ISA slots, three free externally accessible drive bays, and one free internal drive bay—but the SIMM sockets and the CPU are hard to access. In addition, both of the 3½-inch internal drive bays—one of which houses a Western Digital Caviar hard drive—sit on a removable side plate that you have to take out in order to install cards, system RAM, or CPU.



AST Bravo

When it comes to service, AST makes a strong showing. Like many dealer-based vendors, AST doesn't provide a money-back guarantee, but the company's attractive support package includes a three-year warranty and 24-hour toll-free technical support. Hold times for our tech support calls averaged a moderate 5 minutes, and the reps answered all our questions accurately.

Looking at the whole picture, the AST Bravo MT 466d is a reasonably priced DX2-66, backed by good service and support. It's a fair amount of system for the $2800 price, but it's too expensive for the Budget Top 20 and not fast enough for the Power Top 20. *AST Research, 800/876-4278, 714/727-4141* **Reader service no. 799**

AST Premmia LX P/60

PC WORLD TOP 20 9 POWER DESKTOP

PROS: Outstanding performance, excellent service and support **CONS:** High price

If your needs center on demanding applications such as statistical analysis, page layout, or even heavy-duty spreadsheet building, you need the kind of next-generation performance AST's Premmia LX P/60 can deliver. The Pentium performer comes wrapped in a pizza box package. Of course, this kind of power doesn't come cheap—at over $5000, the Premmia is the second most expensive system in our review. But you can't argue with the scorching performance. The Premmia blazed through our test suite in near-record time, placing first in every Windows-based application test, often twice as fast as some DX2-66s. DOS-based scores were not as astounding—most DOS apps don't stress the processor as much as Windows apps do—but the Premmia still placed first or second in every test.

The Premmia comes with 16MB of RAM, a 256K secondary cache, and a 273-pin ZIF socket, which accommodates the Pentium CPU. The Premmia also uses the new PCI bus, which runs 32 bits wide at 30 MHz to deliver graphics and **continued on page 112**

THE TOP 20

PC WORLD

POWER DESKTOPS

1 **IBM ValuePoint 60/D**
Big Blue's red-hot desktop.

➤ Reviewed this month ◄ Reviewed previously

BEST BUYS

		Last month	Months on list	Overall rating	Performance rating	Service rating	Price	CPU type	RAM (MB)	Hard drive (MB)	Bus
1	◄ IBM PC Company ValuePoint 60/D	–	–	80	80	83	$4995	Pentium-60	16	424	ISA
2	◄ AcerPower Series 9000 Pentium	–	–	79	71	89	$5395	Pentium-60	16	520	EISA
3	➤ Zeos 486DX2-66	–	–	79	60	91	$2767	486DX2-66	8	528	ISA
4	◄ ALR Evolution V	–	–	78	81	84	$4955	Pentium-60	16	544	ISA
5	◄ Dell Dimension 466V/XPS	–	–	78	60	80	$3318	486DX2-66	16	340	ISA
6	➤ DECpc XL 466d2	–	–	77	63	99	$5397	486DX2-66	8	1024	ISA
7	➤ AcerPower Series 9000 DX2-66	–	–	76	63	89	$4749	486DX2-66	16	520	EISA
8	◄ NEC Image 466es	–	–	76	63	85	$3510	486DX2-66	8	420	ISA
9	➤ AST Premmia LX P/60	–	–	76	75	85	$5390	Pentium-60	16	540	ISA
10	◄ Polywell Poly 4586VR	–	–	75	61	79	$2500	486DX2-66	8	340	ISA
11	◄ AST Premmia 4/66d Model 343W	–	–	75	60	85	$4082	486DX2-66	8	340	EISA
12	➤ MIS M466T	–	–	74	61	75	$4750	486DX2-66	16	1024	EISA
13	◄ Ares 486-66DX2 EISA/VESA	–	–	74	55	84	$3125	486DX2-66	8	340	EISA
14	◄ Diamond DT 486DX2-66 VL-SCSI	–	–	74	52	82	$2699	486DX2-66	8	400	EISA
15	◄ Gateway 2000 4DX2-66V	–	–	73	59	66	$2995	486DX2-66	16	424	ISA
16	➤ Inmac Insignia 466P	–	–	73	53	92	$2488	486DX2-66	8	170	ISA
17	◄ Netis N4D266VL	–	–	73	53	80	$2385	486DX2-66	8	340	ISA
18	➤ Hertz 486/D66X2e Multimedia	–	–	73	57	83	$4295	486DX2-66	16	1024	ISA
19	◄ Acma 466/2 System	–	–	72	59	74	$3395	486DX2-66	16	540	ISA
20	◄ NCR System 3333	–	–	71	54	92	$3404	486DX2-66	8	340	ISA

** Call 800/234-0455 extension 365 to receive an instant fax of any individual system's review, features chart, and test report using the fax reprint numbers. See page 108 to receive a fax reprint of a month's complete systems review. Touch-tone phone required.*

2 **AcerPower Series 9000**
An ideal server.

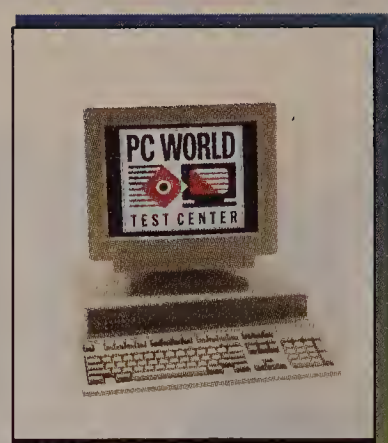
3 **Zeos 486DX2-66**
Lowest price for power.

4 **ALR Evolution V**
They just don't get any faster.

5 **Dell Dimension 466V/XPS**
All-around value.

Monitor size/ dot pitch	Vendor contact number	Issue reviewed	Fax reprint number*	Comments
15"/.28	800/772-2227	Jan 94	3041	Blazing speed, PCI slots, plenty of expansion room, great documentation and service and support.
17"/.28	800/733-2237	Jan 94	3042	All components are top grade except the single-speed CD ROM drive; good service and support.
14"/.28	800/554-5220	current	3043	Super-fast DX2-66 with a great design, best all-around value we've seen.
14"/.28	800/444-4257	Jan 94	3044	One of the hottest performers available, lots of slots.
15"/.28	800/289-3355	Jan 94	3045	Fast DX2-66, first-class service and support; single 16MB SIMM makes RAM upgrades easy.
16"/.26	800/210-1403	current	3046	Fast PCI-based graphics, tons of expansion room, high price.
17"/.28	800/733-2237	current	3047	One of the fastest 486s we've tested, 17-inch monitor; CD ROM drive is only single-speed.
15"/.28	800/388-8888	Jan 94	3048	High-quality flat 15-inch monitor, integrated SCSI, three-year warranty, pricey.
17"/.28	800/876-4278	current	3049	PCI Pentium with outstanding performance, excellent service and support, but expensive.
14"/.28	800/999-1278	Dec 93	3050	A Best Buy in December, terrific performance and expansion, priced reasonably.
17"/.28	800/876-4278	Jan 94	3051	Can upgrade to full Pentium, fast graphics and disk performance, three-year warranty, high price.
17"/.26	800/733-9188	current	3052	Huge tower system, very fast for a DX2-66, 1GB hard drive, 14.4-kilobits-per-second fax-modem.
15"/.28	800/322-3200	Jan 94	3053	Good expandability, 60-day money-back guarantee, two-year warranty.
14"/.28	800/989-7253	Jan 94	3054	Plenty of free slots, removable hard drive plus a SCSI hard drive, so-so graphics subsystem.
15"/.28	800/846-2000	Jan 94	3055	Fast even for a DX2-66, particularly for Windows; good expandability; double-speed CD ROM drive.
14"/.28	800/547-5444	current	3056	Lots of room for expansion, needs larger hard drive, manufactured by IBM.
15"/.28	408/263-0368	Jan 94	3057	Compact desktop relies on 2MB caching controller, good video.
17"/.26	800/232-8737	current	3058	Loaded multimedia system with 2MB caching controller, great video, double-speed CD ROM drive.
15"/.28	800/786-6888	Jan 94	3059	Performance, expandability, and service and support are all solid.
15"/.28	800/637-2600	Jan 94	3060	Excellent service-and-support package, good expandability, pricey.

drive performance that equal or beat those of the VL bus. Finally, a 540MB hard disk offers ample space for applications and files.



AST Premmia

Expandability is decent for such a small box. With three ISA slots and two PCI slots (one shared with ISA), users can install up to four cards. Two externally accessible 5¼-inch drive bays are free. The RAM upgrade picture has a bright side and a dim side: The healthy 16MB configuration will stand you in good stead, and the 72-pin setup lets you mix and match different capacity SIMMs. On the other hand, because all the sockets are filled, you'll have to discard at least one installed SIMM to upgrade, and the sockets' location under the drive is awkward.

When it comes to service and support, AST scores a bull's-eye. The three-year warranty and 24-hour toll-free technical support are as good as anything the industry offers, and AST representatives impressed us with accurate answers to our questions.

The $5390 price of the AST Premmia is too stiff to justify for run-of-the-mill business apps, but for power use, this system will find its way onto a lot of desks. After all, it found its way to number 9 on our Power Desktop Top 20. *AST Research, 800/876-4278, 714/727-4141* **Reader service no. 800**

ATronics Bronze 466 VESA

PROS: Very upgradable, tape backup drive
CONS: No CPU upgrade path

ATronics' imposing tower system is a warehouse among personal computers. Its assortment of quality components would easily fill up an ordinary PC, but in this spacious case you've got plenty of room to pack in more inventory. The three free externally accessible drive bays, four free internal bays, and four free 16-bit slots give you impressive expandability. The Bronze 466 falls short only in CPU and RAM expansion. There is no CPU upgrade socket, and the 30-pin SIMM modules limit your upgrade options.

ATronics

This unit's DX2-66 CPU with 256K secondary cache, roomy 345MB Maxtor hard drive, and 16MB of RAM give you the space and power you need to run today's resource-hungry applications. The 3MB Orchid P9000 VLB local bus graphics accelerator delivers fast video, and the 1MB local bus hard drive controller boosts disk performance. As a finishing touch, ATronics provides you with a 250MB Colorado tape backup drive in addition to floppy drives in both formats. Performance was solid but just midpack. Mysteriously, the unit came up more than 10 percent slower than our median PC on the Freelance test.

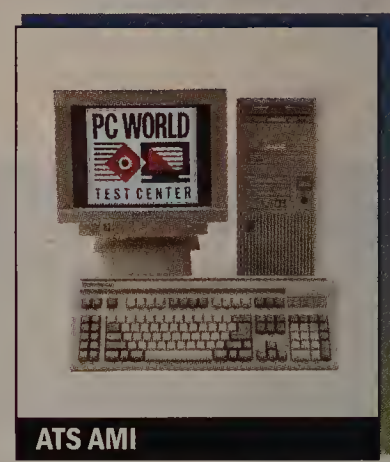
ATronics offers solid support, with a year of on-site service for $69. Technicians answered our calls accurately and courteously.

At $3568, the ATronics Bronze 466 VESA costs several hundred dollars more than a typical DX2-66—to be expected in a system with these kinds of extras. And the great expandability is attractive. But the lack of an upgrade path hurts this PC's rating and keeps it below Top 20 ranking. *ATronics Int'l, 800/488-7776, 510/656-8400* **Reader service no. 801**

ATS AMI Multimedia 486-66

PROS: Big hard drive, multimedia peripherals
CONS: Expensive, gaps in service and support

The AMI Multimedia 486-66 has all the features you'd expect in a multimedia PC. This midsize tower comes stocked with a classy Toshiba XM-3401B double-speed CD ROM drive, a Spectrum 16 Multimedia sound card, and Labtek minispeakers. You also get 16MB of RAM (expandable to 64MB), a 256K secondary cache, a spacious 525MB SCSI hard drive, a 3MB Orchid P9000 VLB local bus graphics accelerator, and a 15-inch monitor. The AMI Multimedia's performance, however, falls far short of the median.



ATS AMI

For a multimedia PC, there's plenty of growing room. The medium-size tower provides a half-dozen free drive bays, three of which are externally accessible. But inside we found a tangled web of power cords, adapter cables, and LED connectors. The SIMM sockets are easy to reach, and ATS prudently installed a single 16MB memory module, leaving three 72-pin SIMM sockets free in case you later decide 16MB isn't enough. And although both VL slots are filled, you have four 16-bit ISA slots free. The drawback in this system's expandability is the lack of a CPU upgrade socket—you're stuck with the DX2-66 that's installed.

Service and support is mixed. ATS adds a 48-month labor warranty to its 12-month parts coverage, but tech support requires a toll call and is available for only 8½ hours weekdays and 7 hours on Saturdays. The tech staffers answered promptly and accurately. As we went to press, ATS dropped its price from $4750 to $3950—still too high for us to recommend the system. *ATS Computers, 619/279-1305* **Reader service no. 802**

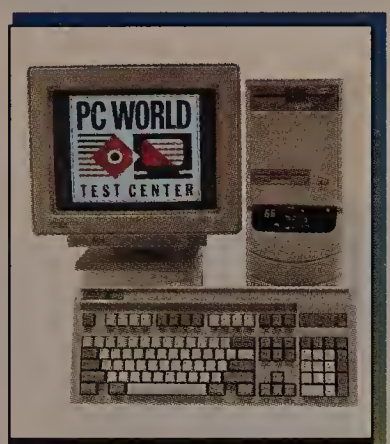
Axik Ace Cache 486DX2-66VG

PC WORLD TOP 20
15 BUDGET DESKTOP

PROS: Energy Star compliant, decent price
CONS: All SIMM sockets filled

We're always pleased to see a system that falls below our median system's price without taking a performance hit. The $2398 Axik's Ace Cache 486DX2-66VG does just that, matching or besting our comparison system on all performance tests.

Expandability is generally good, with three free externally accessible drive bays, two free internal drive bays, one free VL slot (out of three total), and four free 16-bit slots. Our only real complaint here is the SIMM setup. All eight 30-pin SIMM sockets were filled with 1MB sockets. This configuration requires you to remove half the modules to upgrade RAM above 8MB. The unit's 486DX2-66



Axik

CPU rests in a 238-pin socket for future Pentium OverDrive upgradability.

What about the peripherals? The 250MB Quantum hard drive is adequate for a budget PC and is coupled with a 1MB local bus caching hard disk controller. The 1MB Orchid Fahrenheit VA/VLB graphics accelerator comes with 8-bit sound and a microphone—sufficient for business use, annotating documents with voice messages. The 14-inch ADI monitor prevents you from taking full advantage of the high-quality video card, since text at resolutions higher than 640 by 480 becomes quite small. On a positive note, both the system unit and the monitor are Energy Star compliant.

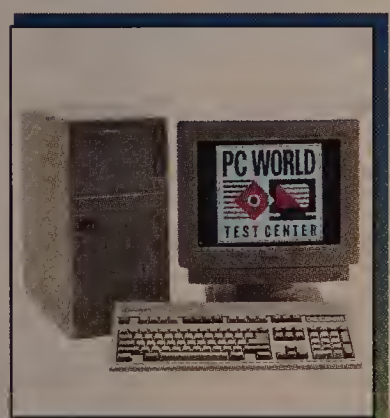
Aside from one missed answer, technical support gets a good rating. Policies include the standard one-year warranty, a 30-day money-back guarantee, and fax and BBS support. Overall, the Axik Ace Cache 486DX2-66VG measures up to what we expect from a solid budget 486DX2-66 system, as its number 15 ranking on our Top 20 Budget Desktops chart attests. *Axik Computer, 800/234-2945, 408/735-1234* **Reader service no. 803**

Caliber-Aspect Smart Weapon 486-66

PROS: Bundled CD ROM drive and sound board
CONS: Limited upgradability

The myth was that the scorching price wars of the last couple of years would put all but a few PC makers out of business as industry gorillas like IBM and Compaq snatched up market share. So what's a relative unknown like Caliber-Aspect doing in our roundup? Just about holding its own.

The $3329 Caliber DX2-66 with its bulky midsize tower is not the most elegant system. But its 16MB of RAM is optimum for a power machine, and the 256K secondary cache and 340MB Maxtor hard drive are competitive. The Caliber isn't as expandable as we'd like a tower system to be. Of the eight slots, only four were free—two each for 16- and 8-bit cards. However, the system comes with a 2MB OEM Cirrus Logic local bus graphics accelerator, and the 15-inch Relisys monitor supports an ergonomic 72-Hz refresh rate at 1280 by 1024 resolution. Best of all, the Caliber's sound board and Toshiba double-speed CD ROM drive make it a one-stop multimedia center. The Pro Audio Spectrum 16 sound board features CD-quality sound and FM-synthesis MIDI, providing an ideal platform for everything from games to presentations.



Caliber-Aspect

The Caliber's low service-and-support scores keep it off our Top 20 list. Although you get a year of free on-site service, the lack of fax support and BBS mean you must discuss any problems with Caliber's tech support staff—no easy feat. The line is toll free, but we waited almost half an hour on one call and got inaccurate answers. So if support is crucial, you'll want to keep looking. *Caliber Computer, 800/995-4584, 408/942-1220; Aspect Computer, 908/563-1304* **Reader service no. 804**

Comtrade VL-Bus Best Buy 66

PROS: Excellent price
CONS: Limited expandability, service-and-support problems

Comtrade showed a lot of optimism when it named this robust $1995 DX2-66 the "Best Buy 66," and indeed it should. This system costs $900 less than our median system, packs in 8MB of RAM, a 256K secondary cache, a 1MB STB Horizon local bus graphics accelerator, a 15-inch monitor, and a roomy 344MB hard disk. Not surprisingly, the VL-Bus Best Buy 66 executed benchmarks just as well as our median system, with a slightly better than average score on our DOS Paradox test.

Expandability falls a little short of our expectations. The heat sink and fan atop the CPU prevent you from installing full-length cards in the system's three free 16-bit slots. (There's also one 8-bit slot free.) The graphics accelerator and the hard disk adapter occupy the system's two local bus slots. Also, while the 238-pin CPU socket should accept a Pentium OverDrive processor when it's available, it's not a ZIF socket, meaning you'll need some chip-pulling expertise to perform a CPU upgrade. However, you get three free externally accessible drive bays.

Comtrade

Our biggest qualm is Comtrade's service and support. In fact, it's the only aspect of this system that keeps it from soaring into our Best Buy ranks. The company offers a comprehensive package—a 36-month warranty, 30-day money-back guarantee, free on-site service, and tech support lines that are open 12 hours a day during the week plus 9 hours on Saturdays. And the technicians impressed us with prompt, accurate responses during our anonymous calls. But complaints to our *Consumer Watch* department indicate customers may have problems getting help. Once Comtrade gets its act together on the service-and-support front, it's almost a sure bet the Best Buy 66 system will be worthy of its name. *Comtrade, 800/969-2123, 818/961-6688* **Reader service no. 805**

DECpc XL 466d2

PC WORLD TOP 20
6 POWER DESKTOP

PROS: Excellent performance, huge hard drive
CONS: Very expensive

DEC's new PCI-based DECpc XL 466d2 has been well worth waiting for. This Massachusetts-based company stood aside as other vendors rushed VL bus systems to market, choosing instead to place its bets on the PCI bus. The result? One of the fastest 486s in this review. With a direct price of $5397, however, it's also the most expensive. **continued on page 118**

THE TOP 20

PC WORLD

BUDGET DESKTOPS

1 **Netis N433VL**
Value doesn't come cheaper.

➤ Reviewed this month ◄ Reviewed previously

BEST BUYS

		Last month	Months on list	Overall rating	Performance rating	Service rating	Price	CPU type	RAM (MB)	Hard drive (MB)	Bus
1	◄ Netis N433VL	–	–	80	38	80	$1660	486DX-33	8	250	ISA
2	➤ Netis N 466 VL Power Station	–	–	79	51	80	$1899	486DX2-66	4	250	ISA
3	◄ Blackship 486DX2/66LB	–	–	79	52	80	$1895	486DX2-66	8	244	ISA
4	◄ Ambra D466BL	–	–	78	49	78	$2178	IBM 486BL-66	8	240	ISA
5	➤ IBM PS/1 Consultant DX2-66	–	–	77	42	89	$2399	486DX2-66	8	420	ISA
6	◄ Netis N4D266VL	–	–	77	53	80	$2385	486DX2-66	8	340	ISA
7	◄ NMC 486 VL-Bus Winstation	–	–	77	38	84	$1891	486DX-33	8	212	ISA
8	➤ Inmac Insignia 466P	–	–	76	53	92	$2488	486DX2-66	8	170	ISA
9	◄ Axik Ace Cache 486DX2-66V	–	–	76	56	77	$2198	486DX2-66	8	245	ISA
10	◄ Polywell Poly 4586VR	–	–	76	61	79	$2500	486DX2-66	8	340	ISA
11	◄ CompuAdd C433S Low Profile	–	–	75	39	77	$1779	486SX-33	8	210	ISA
12	◄ Diamond DT 486C-40 VL	–	–	75	29	81	$1439	Cx486S-40	4	212	ISA
13	◄ Micro Express MicroFlex-VL/S	–	–	74	37	79	$1999	Cx486S-40	16	220	ISA
14	◄ AST Bravo LC 4/66d Model 213W	–	–	74	52	85	$2479	486DX2-66	8	210	ISA
15	➤ Axik Ace Cache 486DX2-66VG	–	–	74	56	77	$2398	486DX2-66	8	250	ISA
16	◄ Eltech Splendor III	–	–	74	40	81	$1999	486SLC2-66	8	250	ISA
17	◄ Insight 486DX2-66 VL	–	–	74	45	60	$2199	486DX2-66	8	240	ISA
18	◄ MIS Promise SL-66	–	–	73	59	81	$2499	486DX2-66	8	240	ISA
19	➤ Tangent VL 466	–	–	73	41	87	$2150	486DX2-66	4	260	ISA
20	◄ Tagram Concerto HI-Note 486DX2-66	–	–	73	47	84	$2520	486DX2-66	8	250	ISA

** Call 800/234-0455 extension 365 to receive an instant fax of any individual system's review, features chart, and test report using the fax reprint numbers. See page 108 to receive a fax reprint of a month's complete systems review. Touch-tone phone required.*

2 Netis N 466 VL Power Station
DX2-66 power for $1900!

3 Blackship 486DX2/66LB
Loaded, and still cheap.

4 Ambra D466BL
Nice balance for a new vendor.

5 IBM PS/1 Consultant DX2-66
Smart power, smart buy.

Monitor size/ dot pitch	Vendor contact number	Issue reviewed	Fax reprint number*	Comments
14"/.28	800/577-7526	Dec 93	3021	Great price even for a DX-33, good performance for its class, lots of room for expansion.
14"/.28	800/577-7526	current	3022	One of the cheapest DX2-66 systems we've seen, and solid everywhere else.
14"/.28	800/531-7447	Jan 94	3023	Inexpensive for a DX2-66, lots of free slots, decent service and support.
14"/.28	800/252-6272	Dec 93	3024	Great video performance, SCSI controller, ethernet, IBM-supplied service and support.
14"/.28	800/426-3377	current	3025	Comes with unique friendly features and software for new users, Energy Star compliant.
15"/.28	800/577-7526	Jan 94	3057	2MB caching controller, good video, power at a good price.
14"/.28	800/424-2983	Dec 93	3027	Fast for a DX-33, local bus video and hard drive controllers, outstanding service and support.
14"/.28	800/547-5444	current	3056	Lots of room for expansion, needs larger hard drive, manufactured by IBM.
14"/.28	800/234-2945	Dec 93	3029	Especially speedy DX2-66 for the price, respectable expandability and service and support.
14"/.28	800/999-1278	Dec 93	3050	Hot performance, ample expandability, responsive support.
14"/.28	800/627-1961	Dec 93	3031	486SX-33–based system outdoes many 486DX-33s; responsive tech support around the clock.
14"/.28	800/989-7253	Dec 93	3032	Very low price, local bus caching controller, good tech support.
14"/.28	800/989-9900	Dec 93	3033	Fast 2MB local bus graphics card, two-year warranty, prompt and accurate tech support.
15"/.28	800/876-4278	Dec 93	3034	Nicely designed compact desktop, nearly flat 15-inch monitor, around-the-clock support.
14"/.28	800/234-2945	current	3035	Low price for a DX2-66 system, fast and solid in all respects.
14"/.28	800/358-8330	Dec 93	3036	Excellent price for a DX2-66 system with CD ROM drive and 16-bit sound.
15"/.28	800/927-7848	Dec-93	3037	Competitively priced DX2-66 system, exceptional expandability, clean design.
14"/.28	800/733-9188	Dec 93	3038	Solid DX2-66 performance, integrated fax-modem, good tech support.
14"/.28	800/800-6060	current	3039	Great expandability, solid service and support, but a little slow.
14"/.28	800/824-7267	Jan 94	3040	Low-cost multimedia system, two-year warranty, super-responsive tech support.

The Toshiba T4700C Series

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T4700CS

- 9.5" Dynamic-STN dual-scan color LCD display

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- Wave™ audio capabilities
- Audio jacks: headphone/speaker and microphone
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- QuickCharge battery recharge system
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- MaxTime™ Power Management system
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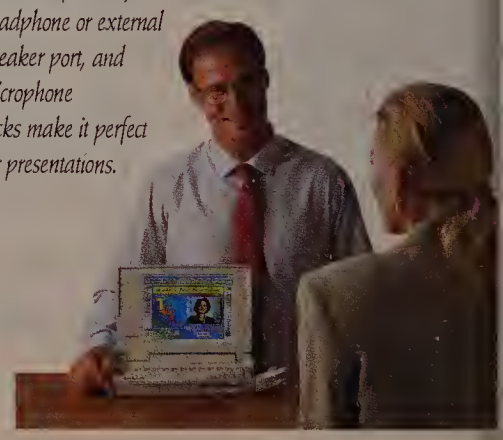

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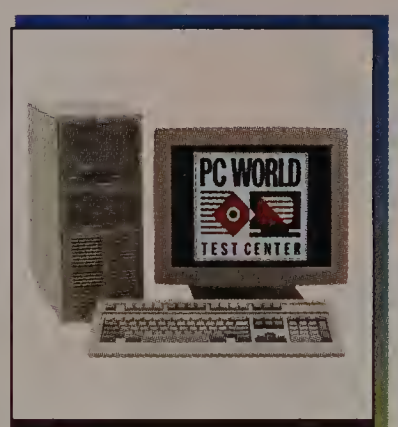
Circle 228 on reader service card

The DEC comes ready to run, with 8MB of RAM expandable to 128MB, and 256K of secondary cache. A 238-pin ZIF socket allows for an easy upgrade to a future processor, and a large system fan and excellent ventilation help ensure that hot-running powerhouse CPUs won't bake themselves into oblivion. Topping off this potent array of components is a monster 1GB SCSI hard drive.

What about the system's PCI bus? At 32 bits wide and operating at 33 MHz, the system's three PCI slots offer performance comparable to VL bus systems'. A fast 2MB Diamond Viper graphics accelerator occupies one PCI slot, helping the DEC roar through our graphics-intensive Windows suite; the other two PCI slots are free. The DECpc XL 466d2 bested our median system in all categories—by nearly 30 percent in the Freelance scores. Four free ISA slots further brighten the upgrade picture, while two externally accessible 5¼-inch drive bays and a single internal 3½-inch drive bay provide room for a tape backup, a CD ROM drive, and the like.



DECpc

As if that weren't enough, DEC's service and support is impressive. Systems come with a lengthy 36-month warranty and are backed by a swift two-day turnaround policy on repairs. Our experience with tech support reps was terrific—they didn't keep us on hold for long and provided accurate answers. The $5397 price is steep, but great performance, a mammoth hard drive, solid design, and superb support all put this 66 firmly in the Power Desktops Top 20. *Digital Equipment, 508/493-5111* **Reader service no. 806**

Epson Endeavor WG 4DX2/66

PROS: Reasonable price, good upgradability
CONS: Slow performance, only one free drive bay

Epson's Endeavor WG 4DX2/66 includes some attractive features for its low $2439 price: 8MB of RAM, a 344MB hard drive, a combo floppy drive, an integrated 1MB local bus graphics accelerator, and a 15-inch monitor. But this system doesn't live up to its DX2-66 pedigree and is almost 20 percent slower than our median system in overall performance.

The Endeavor is reasonably expandable for a compact: The free 72-pin socket accepts up to a 16MB SIMM, and all four 16-bit ISA slots accept full-length cards. The 238-pin ZIF upgrade socket should let you beef up processing power once the Pentium OverDrive upgrade is available. We would have liked more than one free drive bay.

Epson

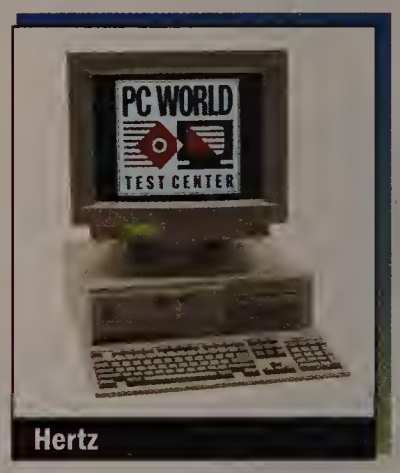
Epson support is so-so. The one-year warranty is the minimum acceptable these days, but it's nice to have free on-site service guaranteed within 24 hours for the first year, a 30-day money-back guarantee, and toll-free tech support 12 hours on weekdays. Tech support performance was the worst problem. While reps answered all our calls within 4 minutes, two of the three responses weren't correct. There's a lot to like about this PC but not enough to lift it anywhere near our Budget Top 20. *Epson Direct, 800/374-7300, 310/782-0770* **Reader service no. 807**

Hertz 486/D66X2e Multimedia System

PC WORLD TOP 20 **18** POWER DESKTOP

PROS: 1GB hard disk, 17-inch monitor, multimedia setup
CONS: Speaker setup occupies drive bay

A price above $4000 calls for commensurate performance and value—and the Hertz 486/D66X2e Multimedia System delivers. This desktop PC runs a hair faster overall than our median DX2-66 system and comes loaded with 16MB of RAM and a humongous 1GB hard drive. In addition, you get a 2MB local bus caching disk controller, a combo floppy drive, a double-speed CD ROM drive, a sound card, and speakers. And Hertz throws in a superior video subsystem featuring a 2MB Diamond Viper VLB graphics accelerator paired with a quality 17-inch monitor—just what the doctor ordered if you want to use the highest resolutions to gain a broader perspective on your worksheets.



Hertz

Expandability and design are mixed. The speakers are installed in an externally accessible drive bay—putting the controls right at your fingertips but also eating up the last free drive bay. Otherwise, the expandability/upgrade path is good. In addition, the RAM setup leaves a bank of 30-pin SIMM sockets free for easy upgrade to the 32MB maximum. And the company places a motherboard map on top of the power supply inside the case, with details on jumper settings and configurations.

Hertz service is good, with a year of on-site service backed by toll-free support that responded to our every call within 2 minutes and answered two of the three questions perfectly. If your system has to go back to the service center, Hertz promises to turn it around in a day.

This multimedia powerhouse machine claims position 18 on our Power Desktop Top 20. Put this system on your list if you want big storage and memory and don't mind the lack of free drive bays. *Hertz Computer, 800/232-8737, 212/684-4141* **Reader service no. 808**

IBM PS/1 Consultant DX2-66

PC WORLD TOP 20 **5** BUDGET DESKTOP

PROS: Outstanding software package, Energy Star compliant, instant-on feature **CONS:** Slow for a DX2-66

IBM's new PS/1 line has unique features that set it apart from the crowd. For starters, IBM preloaded the PS/1s with an array of software designed to help the new user. When the machine turns on for the first time, you can choose to go straight to work in Windows or run a helpful tutorial on your new system. (You can suppress the tutorial option.) IBM provides an index that guides you to explanations of everything from cleaning your PC's case to

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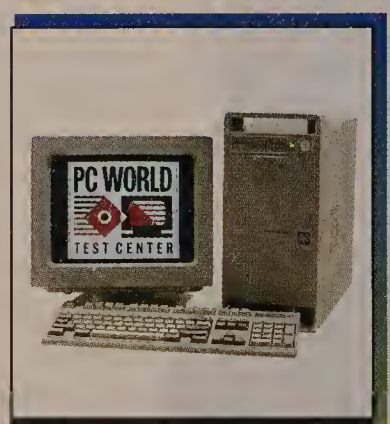
CENTRAL POINT

Circle 52 on reader service card

building a loan amortization worksheet. The machine itself is well designed and documented. And you get many extras, including system utilities, communications software, and Microsoft Works.

The DX2-66 we reviewed had 8MB of RAM and a hefty 420MB hard drive. If you decide to buy one of these systems, get it with at least 64K of secondary cache. None was installed on our test unit, which helped drop performance scores below the DX2-66 average. You'll find two floppy drives plus room for two more externally accessible drives and one internal drive, and a whopping seven free 16-bit slots.



IBM

Video chores are handled by an integrated Cirrus Logic processor with 1MB of DRAM, which drives a 14-inch monitor. IBM even throws in a speedy 14.4-kilobit-per-second fax-modem.

You won't notice the PS/1's friendliest feature the first time you use the system. IBM's ingenious smart-power option saves the system state before shutting down. Next time you turn the system on, it boots up to exactly where you left off, even to the middle of a loading application or a running calculation. And the new PS/1 line is Energy Star compliant and can go to sleep after a specified period of inactivity.

True, this Consultant checked in with subpar performance scores for a DX2-66 system, and IBM surprised us by not offering on-site service. Nonetheless, with its low $2399 price, big hard drive, modem, and software, this PC is loaded with so much value, it places 5th on our Budget Top 20 list. *IBM, 800/426-3377*

Inmac Insignia 466P

PC WORLD TOP 20
8 BUDGET DESKTOP
16 POWER DESKTOP

PROS: Great service and support, good design
CONS: Smallish hard drive

Inmac made its name as a direct supplier of office electronic equipment. It has now moved on to add PCs to its line. The company can do anything from sending you a box of floppy disks to helping you set up your NetWare LAN. Inmac prides itself on great sales support even before it makes a sale, and its eagerness to please comes through on the phone.

Inmac's latest PC, the $2488 Insignia 466P, is manufactured by IBM. This compact desktop is powered by a DX2-66 sitting in a 238-pin CPU socket. The unit is well designed for future expandability, and the interior is devoid of clutter. The 8MB of RAM fills just one 72-pin SIMM socket, leaving three positions left to expand memory; to reach the healthy 64MB RAM limit, you'd have to pull the single 8MB module and install four 16MB SIMMs. The only flaw we see in the memory and storage picture is the system's smallish 170MB Western Digital hard drive. Let's face it: If you're doing heavy office work with Windows applications, you want a bare minimum of 200MB.

With the single 1.44MB floppy drive installed, three externally accessible bays remain free. And the five empty 16-bit slots should be more than adequate. Video duties are handled by an integrated Cirrus Logic 5428 chip local bus controller with 1MB of VRAM. Connected to that is a merely adequate 14-inch monitor.

Inmac Insignia

Inmac service and support is a standout. Inmac has been supplying service as part of its direct-sale system for many years, and the company's expertise showed in its quick and accurate responses to our queries. You get a 30-day money-back guarantee, a 12-month warranty, guaranteed on-site service within 24 hours, and telephone support 24 hours a day, seven days a week. As a result, Inmac easily makes our Budget Top 20 at position 8 as an all-around basic desktop value, *and* it slides into the Power Top 20 at number 16. *Inmac, 800/547-5444* **Reader service no. 809**

MIS M466T

PC WORLD TOP 20
12 POWER DESKTOP

PROS: Outstanding speed, 1GB hard drive, 17-inch monitor
CONS: High price

MIS's $4750 M466T EISA PC is a *big* system in every way. This huge tower comes with 16MB of RAM, a 256K secondary cache, a 1GB hard drive, and a 17-inch Morse monitor. And this MIS blitzed though our tests with one of the best scores we've ever seen on a DX2-66 system. Scores on the 1-2-3 test were particularly notable—this system actually surpassed several Pentiums we've tested. And the 238-pin ZIF CPU socket suggests an upgrade path leading to the Pentium OverDrive.

The tower case has two externally accessible drive bays free along with three internal bays for hard drives. The motherboard has eight EISA slots total, two of which are EISA/VESA slots. Even with the latter filled, you get six free 32-bit slots; but only two will accept full-length cards.

The 1GB DEC hard drive connects to an UltraStor VL-Bus SCSI adapter in one VLB slot, while the other holds a 2MB ATI Graphics Ultra Pro graphics accelerator. This video powerhouse is ably matched with the 17-inch monitor. The video subsystem supports resolutions up to 1280 by 1024. MIS rounds the system out with a U.S. Robotics 14.4-kilobit-per-second fax-modem.

MIS MicroNiche

Service and support could be better: On-site service is a reasonable $25 for the first year, but support technicians answered two of our three questions incorrectly. There's no weekend support, but MIS promises a particularly fast one-day turnaround on factory repairs. The $4750 price is quite high for a DX2-66, but this is a loaded system—ranking number 12 on the Power 20 list. Just keep in mind that this PC's price approaches that of some full-blown Pentium PCs—although we know of no Pentium system with a 1GB hard disk or a 17-inch monitor, not to mention a fast fax-modem, that's priced this low. *MIS Computer Systems, 800/733-9188*
Reader service no. 810

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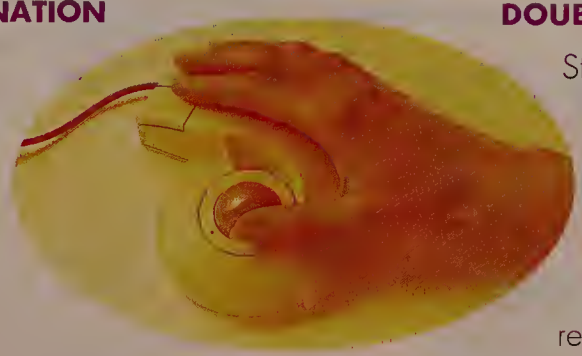

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Circle 241 on reader service card

NCR System 3000 Model 3333

PROS: Great support, excellent design
CONS: Slow, pricey for a 486DX-33

It's fast becoming a DX2-66 world. Even so, NCR's System 3000 makes an impressive showing. While it checked in considerably slower than our DX2-66–based median system, the 3000 left a lot of its DX-33 brethren in the dust. That's a fine showing from a system with 8MB of RAM and just 64K of secondary cache.

NCR

NCR's thoughtful design elements were immediately evident when we removed the cover. The motherboard is laid out carefully, with the ZIF CPU socket, SIMM sockets, and secondary cache accessible. The documentation is clear, making upgrades simple even for novices. The System 3000 features a 2MB Diamond Viper VLB graphics board and a 15-inch NCR High Ergonomic Color Display, which work together to deliver flicker-free performance at 1024 by 768 resolution.

NCR's ace is its service and support. It provides everything you could ask for: a 30-day money-back guarantee, a 36-month warranty, free on-site service for the first year, and quick one-day turnaround on factory repairs. And you get toll-free tech support around the clock seven days a week. NCR's support is responsive and accurate.

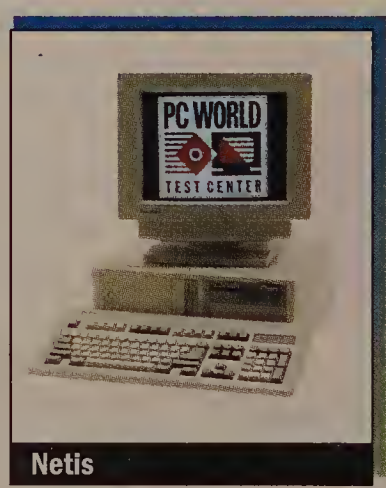
The sticking point? $3190 is a lot for a 33 these days; plenty of DX2-66–based PCs can be had for less. But if impeccable design and super service mean more to you than DX2-66 performance, give the NCR 3000 a hard look. *NCR, 800/637-2600, 513/445-5000* **Reader service no. 811**

Netis N 466 VL Power Station

PC WORLD TOP 20 — 2 BUDGET DESKTOP

PROS: Excellent price, good service and support
CONS: Inflexible RAM upgrades

The Netis N 466 VL Power Station shows how little you can pay for a 486DX2-66. Its $1899 price makes this PC the fourth-cheapest system reviewed this month and the least expensive DX2-66. Meanwhile the Netis still delivers features—such as a 238-pin socket for an OverDrive processor and a 2MB VL bus caching hard disk controller—ordinarily associated with more expensive systems. That's why this system is number 2 on our Budget Top 20 list, and a solid Best Buy.



Netis

Lunch isn't entirely free, however: The 4MB RAM configuration and 250MB IDE hard drive are minimal offerings on a 486DX2-66. A bank of SIMM sockets is available for upgrading memory as far as 32MB, but you can upgrade only to 8MB or 20MB without pulling the installed SIMMs.

Performance is average for a 66, although the disk caching controller helped provide a strong showing on the Paradox for DOS benchmark. The local bus graphics accelerator with 1MB DRAM combines with Netis's 14-inch monitor to provide an ordinary but adequate graphics subsystem. This system has good expandability: Four 16-bit slots, two 8-bit slots, and one 3½- and two 5¼-inch drive bays (all externally accessible) are free.

Service and support are decent, with responsive, accurate, toll-free tech support available 10 hours a day, 6 days a week. You get a one-year warranty, on-site service for $75 a year, and a 30-day money-back guarantee. If you're looking for a low-cost basic workstation with reasonable performance and features that should last a few years, Netis will sell you a Best Buy 66 for a 33-MHz price. *Netis Technology, 800/577-7526, 408/263-0368* **Reader service no. 812**

Tandy Omni II

PROS: Very expandable
CONS: Slow, no toll-free support

What can we say about the Tandy Omni II? Like a meal at your local diner, it's available right around the corner at any Radio Shack. But this is no blue-plate special. Granted, this roomy midsize tower system is a breeze to upgrade; everything, including the seven free slots, four free drive bays, and 238-pin ZIF CPU socket, is readily accessible. But for $3135, there are plenty of less expensive DX2-66s around, and this system's performance is far below the median. While you may get more RAM than usual (10MB), the 214MB hard drive isn't all that big, and you get no secondary cache.

Tandy

Tandy's uncompetitive central support doesn't help matters. Tech support involves a toll call, and it's available just 8 hours a day, weekdays only. Tandy does offer the convenience of a local Radio Shack for service, but the company doesn't require its dealers to use trained support technicians.

In short, you're paying a four-star price for local fare. The Omni II is nowhere near our Top 20 charts, and knowledgeable buyers won't choose it. *Tandy Corp., 817/390-3011* **Reader service no. 813**

Tangent VL 466

PC WORLD TOP 20 — 19 BUDGET DESKTOP

PROS: Ample free expansion slots
CONS: Poor performance

Tangent builds a lot of expandability into this sharp-looking black compact and makes everything readily accessible. You'll find free slots in a range of flavors—one VESA local bus, three 16-bit, and two 8-bit—and two free drive bays. A local bus graphics accelerator and hard drive adapter fill the other two local bus slots without cluttering the case's tidy interior. And the 238-pin ZIF socket should allow you to upgrade the DX2-66 to the forthcoming Pentium OverDrive.

In addition to great expandability, Tangent offers solid service and support. Technicians answered our calls perfectly after an average of

QEMM 7 finds room nobody else can.

Sooner or later, you'll get an "Out of Memory" message. Whether you have 1 megabyte or 16.

TSRs and network utilities need memory right where your programs need it, too. It's called 'lower' or 'conventional' memory.

Adding RAM to your PC just gives you more expanded or extended memory — accessible to some programs, but not to TSRs like fax utilities, device drivers or network utilities like Novell NetWare. Fortunately, there's an easy software solution to 'out of memory' problems.

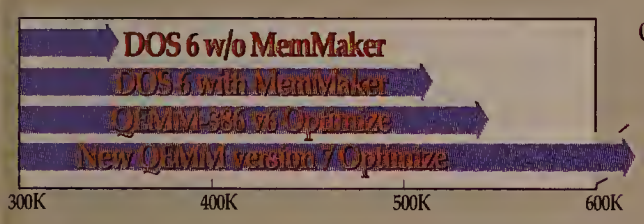
NO VACANCY

Have Your Cake and Eat it, Too.

The more memory you have, the more flexibility and reliability you can enjoy. Thanks to our patent-pending 'stealth' technology, QEMM finds as much as 96K more high memory than other memory managers.

No one has yet been able to match our performance. No wonder QEMM outsells all the others *put together*!

QEMM™ puts the maximum memory right where your favorite programs need it so you can run them and TSRs without 'out of memory' problems or conflicts. That keeps your PC running smoothly and performance at its best.



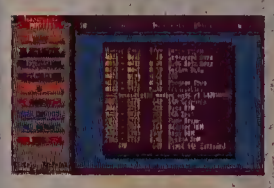
We tested DOS with and without MemMaker and with QEMM 6 and our new QEMM 7 runs away from all of them. See details of test conditions below.

"I needed another 32K for my favorite TSR. I added 2 megabytes. I still need 32K! What gives?"

Protect Your Productivity; Keep Your Work Safe.

Any task, from programming to writing the company business plan to composing a personal letter, takes time and thought. Your PC is supposed to make that process easier; your output better. When you can't run your favorite grammar-checking TSR or have to get by without a vital network utility, you're sacrificing productivity.

Whether you're running MS-DOS, IBM™ PC-DOS, DR DOS, Novell DOS or MS Windows; one megabyte or eight, don't sacrifice; don't compromise; don't risk losing work.



QEMM comes with the new version of Manifest, the award-winning memory analyzer that helps you see how your PC works.

Managing your memory well is the best way to assure your work won't go to waste.

QEMM version 7 is the most powerful, flexible memory manager you can buy.

It's the utility that finds memory when nothing else can.

VACANCY

Quarterdeck

Quarterdeck Office Systems, 150 Pico Boulevard, Santa Monica, CA 90405 (310) 392-9851 Fax (310) 314-4219

How we got the chart numbers CPU—486/33 ALR Power/business VESA machine equipped with 16 megs of RAM and running MS-DOS 6. Comparisons were done using the following memory managers: QEMM 7, QEMM 6.02, MS-DOS 6 MemMaker. In addition to the driver (or drivers) required by each memory manager, the following drivers, DOS resources and programs were loaded for all comparisons: in the CONFIG.SYS file: SETVER.EXE, DOS=HIGH, FILES=20, BUFFERS=10, STACKS=0,0, MVSOUND.SYS, SNDBK12.SYS, SLCD.SYS, DOS SHELL=statement, in the AUTOEXEC.BAT file: VSAFE, MSCDEX, UNDELETE, LSL.COM, NE2000.COM, IPXODI.COM, NETX OR EMSNETX, MOUSE.COM, SMARTDRV.COM, PRTSCCAP.COM. ©1993 Quarterdeck Office Systems. Trademarks are property of their respective owners.

Circle 189 on reader service card

4 minutes on hold—a reasonable wait. You get a two-day turnaround on factory repairs, 11 hours of daily toll-free technical support on weekdays, and 7 hours on Saturdays. Tangent backs its standard one-year warranty with a year of free on-site service.

Tangent

The Tangent VL 466 is no speedster. It took over 35 percent longer than our median system to complete our performance tests. Windows users should buy this PC with more than the installed 4MB of RAM—8MB at the very least. The sticking point is the 30-pin SIMM socket design. You'll have to buy a 16MB system unless you're ready to accept an 8MB PC with no room to add memory without discarding installed SIMMs. The $2150 direct price is excellent for a 486DX2-66 with a 260MB hard drive and will remain very good even once you add extra memory. The Actix ProStar VL graphics card and Axis CM-1430 14-inch monitor are no more than basic. Nonetheless the Tangent VL 466 offers impressive expandability and support at a more than fair price. As a result, it manages a spot on our Budget Top 20 list at position 19. *Tangent Computers, 800/800-6060, 415/342-9388* **Reader service no. 814**

Xinetron X/LAN Station DX2/66

PROS: 1MB caching controller
CONS: Slow for a DX2-66

This minitower system is a pure-vanilla DX2-66 with just a standard 486 socket and no apparent CPU upgrade path. Xinetron did load the unit with 16MB of RAM, leaving a bank of 30-pin SIMM sockets available for expansion. To go all the way to the maximum 64MB, however, you'd have to pull the installed 4MB SIMMs. We were surprised that even with a seemingly adequate 128K secondary cache and the large helping of RAM, this X/LAN Station turned in below-average performance scores.

The case holds two externally accessible 3½-inch bays and two 5¼-inch bays (one each is free). The two VLB slots are filled with the graphics and IDE drive adapters, but four 16-bit ISA slots are free. Only one of these free slots, however, will accept a full-length card.

The 245MB hard drive is not far above the minimum for a DX2-66 these days, but the 1MB VLB caching drive controller is a plus. Xinetron provides a 1MB Cardex local bus graphics card, which uses the Tseng ET4000-W32 accelerator chip. The 15-inch Socos monitor supports flicker-free refresh rates through its maximum resolution of 1024 by 768, although we feel it could deliver a crisper picture overall.

Xinetron

Xinetron service and support rates average overall. The company provides an outstanding 36-month warranty, a 30-day money-back guarantee, and 2-day turnaround on factory repairs, but these pluses are negated by the lack of on-site service, as well as a missed callback and some long waits on hold when we checked in.

The $2945 direct price is about average for a DX2-66 these days, although that usually gets you more in the way of features. However, since the X/LAN Station DX2/66 does not distinguish itself in any way, and since it turned in a subpar performance for this processor class, it doesn't make our Top 20 lists. *Xinetron, 800/345-4415* **Reader service no. 815**

Zeos 486DX2-66

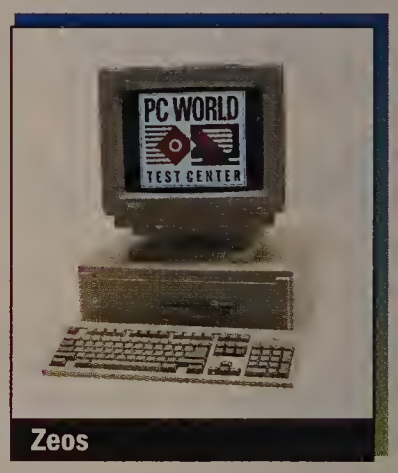
PC WORLD TOP 20 3 POWER DESKTOP

PROS: Excellent performance, design, and support; low price **CONS:** None

With this 486DX2-66, Zeos delivers a super-high-value system. In fact, we're knocked out by the success of Zeos's attempt to be all things to all buyers: This model is not only a Best Buy, it's number 3 on our Power Top 20 *and* a good enough value to appeal to budget-minded buyers. If it wasn't priced higher than our limit, it would have found its way into the Budget Top 20 based solely on total overall value for money.

Performance is excellent—high in the rankings—and the Zeos runs our benchmarks over 8 percent faster overall than our median system. At its attractive $2767 price, it comes configured with 8MB of RAM (expandable to 64MB), a 256K secondary cache, a capacious 528MB Seagate ST3655A drive, and a fast 1MB Diamond Viper VLB accelerator card.

You couldn't ask for much more in Zeos's design: The well-laid-out motherboard allows easy access to everything—expansion slots; the 238-pin ZIF socket holding the CPU; cache sockets; and two empty 72-pin SIMM sockets, available for adding more RAM. A 32-bit VL slot, five 16-bit slots, and an 8-bit slot are free. And even with both floppy drives included, one internal and two externally accessible drive bays remain free. Zeos even included an integrated internal SCSI port—you can get the SCSI host adapter chip installed for a minimal extra cost when you order the computer, or you can purchase it later and install it yourself with the help of Zeos's excellent documentation.



Zeos

Service is strong. Calls were fielded quickly, and even the minimal waits on hold are made productive by recorded tips that provide details on configuring a modem and using Zeos online tech support. And the technicians' accuracy was impeccable. The rest of the service package remains competitive, with toll-free 24-hour tech support 7 days a week, a 30-day money-back guarantee, a one-year warranty, and a 2-day turnaround on factory repairs. A year of on-site service costs $49.

Zeos puts the cherry on the sundae with a free Lotus Windows application. So what are we left with? A powerful Best Buy that has exceptional appeal for both performance and budget buyers. This system should appeal strongly to those looking for an overall balance between power and price. *Zeos Int'l, 800/554-5220, 612/633-9614* **Reader service no. 816**

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QMS 860 Hammerhead Print System
600x600 dpi • 11" x 17"/A3 • SRP $4595

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And now the world's most popular 11 x 17/A3 laser printer is available with all of the features of the QMS 860, plus 1200x600 dpi resolution output...the powerful 24 MB QMS 860 Plus!

These desktop printers are creatures like no others - able to operate in mixed environments of PC, Macintosh® and workstation systems with standard and optional interfaces. Yet, with all their impressive power, they are both surprisingly affordable.

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FEATURES	BENEFITS
• QMS 860 – 600x600 dpi output • QMS 860 Plus – 1200x600 dpi output	High resolution for camera-ready originals or accurate prepress proofs
• QMS 860 – Up to 11x17/A3 output • QMS 860 Plus – Up to 11x17/full bleed output (11x17 full edge-to-edge)	More flexible page layout, B-size check plots and no need for tiling
• QMS Crown™ technology, featuring multitasking, advanced job spooling, compile-ahead processing, context switching and virtual memory	Increases print job responsiveness, provides a platform for convenient, cost-effective enhancements and enables peak performance as a network node with interfaces supporting protocols that include EtherTalk,™ NetWare® and TCP/IP
• Compatible with a variety of languages including PostScript™ Level 2 and Level 1, HP PCL® and HP-GL®	Accommodates the latest application software on all major platforms
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• ESP (Emulation Sensing Processor)	Eliminates user intervention to select compatible printer language
• 39 resident type fonts, all with multilingual character sets	Flexibility and creativity for document production
• An international network of service and support organizations in over 230 metropolitan areas throughout the U.S. and around the world	Fast, local response to service and support requirements
• Several convenient service plans that include on-site response within an average of 4 hours, emergency service and other options	Flexible programs designed to be just right for your needs
• Our exclusive Q-Fax (800-633-3850 or 205-633-3850) and CompuServe® (GO DTPVEN) services at your fingertips 24 hours a day	Quick and easy access to a full range of information and support
• Full one-year warranty	Parts and labor coverage for the important components of your print system
• Emergency telephone support	Direct dialog with technical experts
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A new point of view.

First impressions are important.
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Samsung took for granted you wanted bright, crisp clear images that don't flicker. You're also concerned about things like safety and energy conservation, so they're standard on the whole series.

energy
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Life should be as hassle-free as possible, so we added some innovative new ideas like On-Screen Display, and as you would expect, each SyncMaster GL Series monitor comes with a two-year warranty.

So look at what it takes to satisfy your monitor needs. Samsung did. And came up with a whole new point of view.

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Size	14"	15"	17"
Dot Pitch	.28	.28	.28
Maximum Resolution	1024x768	1024x768	1280x1024
Maximum Refresh Rate at Maximum Res.(Hz)	76	76	60
MPR-II (Low radiation)	•	•	•
Power Management	•	•	•
Flat Square Screen		•	•
On-Screen Programming			•
Warranty	2 Years	2 Years	2 Years

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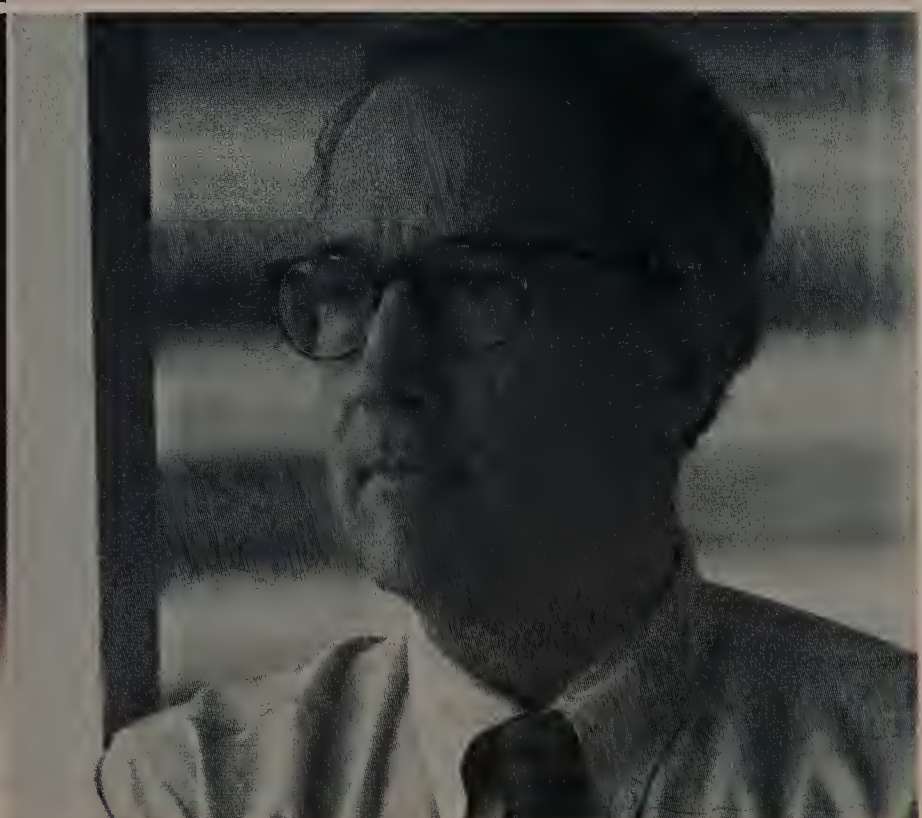
SyncMaster 14GL

SyncMaster 15GL

SyncMaster 17GL



Circle 198 on reader service card

System Snapshots

These systems, which we also reviewed this month, don't match the preceding group for overall value in a business environment. However, some of them present unique and valuable solutions for various needs.

Blackship BLK 486/33 LB

DIRECT PRICE: $1445 **PROCESSOR:** Intel 486DX-33
PROS: Great price, good service and support
CONS: Slow

Blackship's BLK 486/33 LB has a number of factors in its favor—expandability, service and support, and *especially* price. At $1445, this system costs just half as much as our median PC, and it comes with one year of free on-site service, a two-day turnaround on factory repairs, and accurate, responsive tech support. The six free expansion slots—including one VESA local bus slot—and three free drive bays provide plenty of expandability.

Sluggish performance, however, is the BLK 486/33 LB's real drawback. The unit took nearly a third longer than the average DX-33 we've evaluated to complete our benchmarks, and more than twice as long as our median system. In its favor, the system's 238-pin ZIF socket allows you to upgrade easily to a 66-MHz 486 OverDrive or a Pentium OverDrive once that CPU becomes available. But despite its attractive price, the BLK 486/33 LB lacks the performance to place high in our ranking. *Blackship Computer Systems, 800/531-7447, 408/432-7500* **Reader service no. 817**

Dell NetPlex 433/P

DIRECT PRICE: $2219 **PROCESSOR:** Intel 486DX-33
PROS: Excellent service and support, Energy Star compliant **CONS:** Sluggish performance, very limited upgradability

Renowned for solid products and service and support, Dell has built a reputation as a company you can count on before and after you buy. Dell personnel are consistently courteous and accurate, and who can complain about round-the-clock toll-free tech support seven days a week and free on-site service for the first year? And this system's design is intriguing—it's one of a new generation of energy-saving PCs that can power down to less than 30 watts when not in use.

Unfortunately, limited expandability (three free 16-bit ISA slots and two free drive bays) and uncompetitive performance keep this system out of the running. The NetPlex 433/P just can't make it over the price/performance hurdle. Like other 33-MHz 486-DXs, it took almost twice as long as our median system to complete the Paradox and Word for Windows tests. You can get a lot more power for your $2219. You even have a choice of several clock-doubled 66-MHz systems for below that price, including our top Budget Desktop Best Buy. *Dell Computer, 800/289-3355, 512/338-4400* **Reader service no. 818**

IBM ValuePoint 433DX/Si

DIRECT PRICE: $1889 **PROCESSOR:** Intel 486DX-33
PROS: Excellent service and support **CONS:** Sluggish performance, high price, skimpy RAM

Recent IBM PC Company offerings have landed high on our list of hits, but we can't say the same for the ValuePoint 433DX/Si. Not that it's a bad PC—actually it's a solid if lackluster system, backed by IBM's high-quality service and support. And it has some elegant design points: Just twisting a key unlocks the case, which tilts up to reveal a very clean motherboard with accessible components. Adding memory is a cinch, thanks to three easily accessible, open 72-pin SIMM sockets, and this DX-33 is processor upgradable via a 238-pin socket.

As it stands, however, we cannot recommend this system. Performance—as with most DX-33s—is the limiting factor, and this system produced slow benchmarks even compared to other DX-33s in this review, likely due to its meager 4MB of RAM. The smallish 212MB hard drive and skimpy 512K of video RAM do little to improve the value. Alluring as the low $1889 price is, this ValuePoint is a tad overpriced—another $100 to $200 will buy you a fully configured DX2-66. *IBM PC Company, 800/426-2968*

MIS MicroNiche M486-33

DIRECT PRICE: $2012 **PROCESSOR:** Intel 486DX-33
PROS: Low price, six free slots **CONS:** Underpowered, skimpy RAM, small hard drive.

MIS appears to have missed the boat with this DX-33. At a time when strongly configured DX2-66 systems are starting to slide in under $2000, this DX-33 with 4MB RAM and a 120MB hard drive doesn't make much of a splash.

Not that the M486-33 lacks potential. Bumping RAM to 8MB should yield a marked improvement in performance, and the 256K of secondary cache that comes with this PC is plenty. The system has a 238-pin ZIF socket for future upgrading to faster processors. In fact, expandability is better than in most systems. Three SIMM slots are open, and you have six unoccupied expansion slots at your disposal, including a VESA local bus slot, plus one free drive bay. And while MIS service and support is generally unexceptional, the company does offer a terrific one-day turnaround on factory repairs.

Unfortunately, none of these solid features can make up for the system's uncompetitive DX-33 performance. For the money, you can get a lot more computer. *MIS Computer Systems, 800/733-9188, 408/730-9188* **Reader service no. 819**

Xinetron 486DX2-50

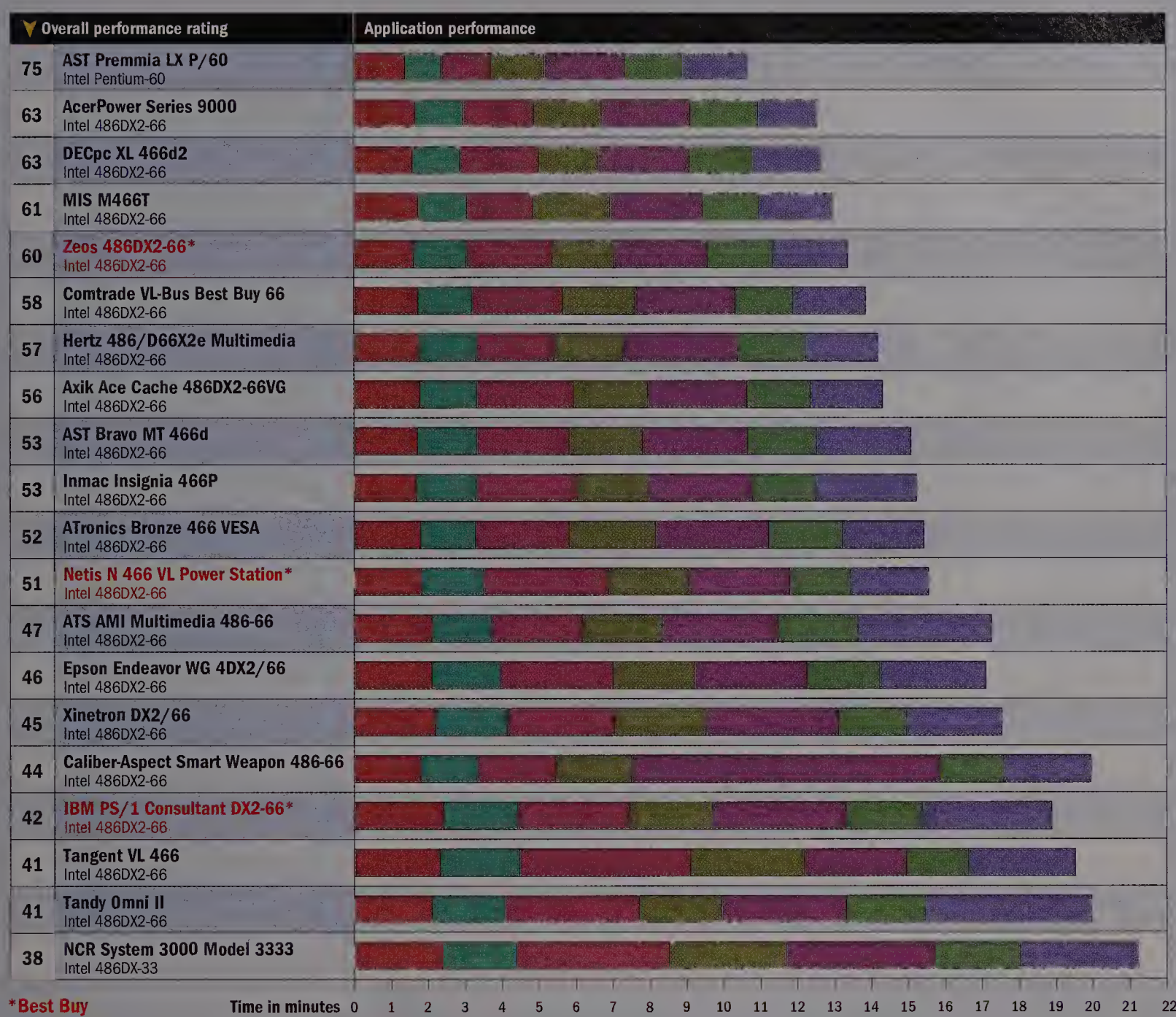
STREET PRICE: $1855 **PROCESSOR:** Intel 486DX2-50
PROS: Low price, LAN card, long warranty **CONS:** Slow performance, no on-site service

Xinetron's $1855 486DX2-50 is a network-ready workstation at a budget price, and it comes with a 14,400-bps fax-modem. But this system shouldn't be your first choice—the company cut too many corners in its overall design.

Let's take performance. It's no surprise when a DX2-50 can't keep up with DX2-66s, but this Xinetron was slower than expected, running our tests about half as fast as our median system. The peripherals tend to be low-end, especially the 131MB hard disk.

Expandability? This minitower's one free 16-bit ISA slot and two free drive bays offer decent peripherals expansion, but since all eight 30-pin SIMM sockets have RAM modules, you'd have to yank memory to upgrade above 8MB. Xinetron's service and support is also a mixed bag. The three-year warranty and two-day turnaround on repairs are great, but there's no on-site service option, and tech support is spotty. Despite the network-ready convenience and low price, the 486DX2-50 is far from our Budget Top 20. *Xinetron, 800/345-4415, 408/727-5509* **Reader service no. 820**

This Month's Lone Pentium System Gets Five Stars for Power



Systems are arranged in order of overall performance, with the fastest at the top. The overall performance rating is a normalized, weighted average of all our performance tests, and a higher value is better. Since the individual tests are normalized and weighted, one system's overall performance rating may be better than another's even though it takes longer to complete all tests.

Methodology
We tested each system as supplied by the manufacturer using the version of DOS supplied. If we installed Windows, we performed the default installation. We configured Windows with an HP LaserJet III as the default printer, disabled Print Manager, and attached a null printer to LPT1. We set video resolution to 800 by 600 pixels in 256 colors using the supplied video driver where possible. We loaded the test applications and files, and test automation software and scripts.

Word for Windows 2.0
We worked with 1-, 9-, and 28-page business documents. Operations included creating, saving, opening, scrolling, editing, checking spelling, formatting, previewing, and printing.

Excel 4.0
We worked with a financial statement and a mortgage analysis and performed several data extracts; entered data, formatted, previewed and printed, opened, saved, scrolled, moved blocks, and altered calculations.

Paradox for Windows 1.0
We used a custom form to add a moderate number of records to an existing table, performed several queries, and generated a report.

Freelance for Windows 1.0
We built a six-page presentation using a standard template, clip art, text, and charts; applied several views to the presentation; previewed each view with varying fade effects between each pair of slides; and saved the presentation.

WordPerfect 6.0 for DOS
We performed a variety of editing, formatting, preview, and printing tasks on documents ranging from a single-page memo to a long report. Due to memory requirements, the amount of free memory for DOS in the first 1MB dramatically affects this test.

1-2-3 Release 3.4 for DOS
Using the graphical WYSIWYG mode at standard VGA resolution, we created, edited, and altered formulas; and built graphs, saved, and printed in three different files.

Paradox 3.5
We tested running under Windows in a DOS window. We entered data, searched records, updated, and generated reports from a simple customer list.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

FEATURES COMPARISON: THIS MONTH'S CONTENDERS

IBM, Netis, and Zeos Stand Out in a Quality Field

● Yes
○ No
n/a = not applicable

	AcerPower Series 9000 DX2-66	AST Bravo MT 466d	AST Premmia LX P/60	ATronics Bronze 466 VESA	ATS AMI Multimedia 486-66	Axik Ace Cache 486DX2-66VG	Caliber-Aspect Smart Weapon 486-66	Comtrade VL-Bus Best Buy 66
Standard features								
Selling price as of 11/1/93[1]	$4794	$2800	$5390	$3568	$4750	$2398	$3329	$1995
CPU	486DX2-66	486DX2-66	Pentium-60	486DX2-66	486DX2-66	486DX2-66	486DX2-66	486DX2-66
CPU/upgrade socket	238-pin	238-pin	273-pin ZIF	○	○	238-pin	238-pin	238-pin
BIOS	Acer 7/1/91	AST 8/1/93	AMI 6/14/93	AMI 6/6/92	AMI 11/11/92	AMI 8/8/93	AMI 8/8/93	AMI 6/6/92
Installed /maximum RAM (MB)	16/64	8/64	16/128	16/32	16/64	8/32	16/32	8/64
30-pin or 72-pin SIMMs	72-pin	72-pin	72-pin	30-pin	72-pin	30-pin	30-pin	both[2]
SIMM sockets/number free	4/0	4/2	4/0	8/4	4/3	8/0	8/4	10/8
Secondary RAM cache installed/maximum (K)	256/1024	64/256	256/256	256/256	256/256	256/256	256/256	256/256
Case style	compact	minitower	pizza box	tower	tower	tower	tower	desktop
Free externally accessible 3½-inch/5¼-inch drive bays	0/2	0/3	0/2	0/3	2/1	1/2	0/3	1/2
Free internal 3½-inch/5¼-inch drive bays	0/0	1/0	0/0	4/0	2/1	1/1	1/0	0/0
Free 32-bit EISA/16-bit ISA/8-bit ISA expansion slots	6/0/0	0/6/0	0/3/0	0/4/1	0/4/0	0/4/0	0/2/2	0/3/1
PCI or VL bus slots/number free	2VLB/1	0/0	2PCI/2	2VLB/0	2VLB/0	3VLB/1	2VLB/0	2VLB/0
Hard disk	Fujitsu M2691ESA	WD Caviar 1170	Quantum LPS540A	Maxtor 7345RT	Quantum LPS525S	Quantum LPS240AT	Maxtor LXT 340S	Conner CP30344
Size (MB)	520	170	540	345	525	250	340	344
Adapter	integrated/ Adaptec	integrated IDE	integrated IDE	1MB DC-680 VLB	Adaptec/ AHA 2842VL	1MB Promise DC-4030VL	Ultrastor Ultra 34F (VL-SCSI)	Data Technology DTC 2270VL
Floppy drives (MB)	1.44	1.44	1.44	1.2, 1.44	combo	1.2, 1.44	1.44	1.44
Graphics adapter	Acer L45	integrated	integrated	Orchid P9000 VLB	Orchid P9000 VLB	Orchid Fahrenheit VA/VLB	Cirrus Logic SVGA24	STB Horizon VL
Installed VRAM/DRAM (MB)	2/0	0/1	1/0	2/1	2/1	0/1	0/2	0/1
Monitor	AcerView 76i	AST Vision 5L	AST SVGA-LR	Shamrock SRC1501 Hyper VGA III	Mag/ MX15F	ADI Microscan 3G/LR	Relisys RE1564	CTX/ CMS1561
Screen diagonal (inches)/dot pitch (mm)	17/.28	15/.28	17/.28	15/.28	15/.26	14/.28	15/.28	15/.28
Modem fax/data speed (kilobits per second)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Sound board	○	○	○	○	Spectrum 16 Multimedia	○	Pro Audio Spectrum 16	○
CD ROM drive	Sony 541	○	○	○	Toshiba XM-3401B	○	Toshiba XM-3401B	○
Sequential data transfer rate (kilobytes per second)	150	n/a	n/a	n/a	330	n/a	330	n/a
Parallel/serial/mouse/MIDI-game/audio/SCSI ports	1/2/1/ 0/0/0	1/2/1/ 0/0/0	1/2/1/ 0/0/0	1/2/0/ 1/0/0	1/2/0/ 1/0/1	1/2/0/ 1/1/0	1/2/0/ 1/1/1	1/2/0/ 1/0/0
Service and support								
Warranty (months)	12	36	36	12	12/48[5]	12	12	36
30-day money-back guarantee	●	○	○	●	●	●	●	●
On-site service price for first year	free	free	free	$69	free	free	free	free
Turnaround policy (days at service center)	3	2	2	3	2	2	2	2
Daily toll-free phone support (hours)	24	24	24	9	8.5[9]	12	10	12
Weekend support	●	●	●	○	●[10]	●[10]	○	●[10]
BBS	●	●	●	●	●	●	○	●
Fax	●	●	●	●	●	●	○	●

[1] All systems priced as configured with DOS, Windows 3.1, a keyboard, and a mouse. Selling price is either direct or based on vendor estimate.

[2] Unit has eight 30-pin sockets and two 72-pin sockets.

[3] This monitor is dicontinued as of January 1994.

[4] Can add SCSI control chip for $49.

[5] 12 months parts, 48 months labor.

DECpc XL 466d2	Epson Endeavor WG 4DX2/66	Hertz 486/D66X2e Multimedia System	BEST BUY IBM PS/1 Consultant DX2-66	Inmac Insignia 466P	MIS M466T	NCR System 3000 Model 3333	BEST BUY Netis N 466 VL Power Station	Tandy Omni II	Tangent VL 466	BEST BUY Xinetron X/LAN Station DX2/66	Zeos 486DX2-66
$5397	$2439	$4295	$2399	$2488	$4750	$3190	$1899	$3135	$2150	$2945	$2767
486DX2-66	486DX2-66	486DX2-66	486DX2-66	486DX2-66	486DX2-66	486DX-33	486DX2-66	486DX2-66	486DX2-66	486DX2-66	486DX2-66
238-pin ZIF	238-pin ZIF	○	238-pin	238-pin	238-pin ZIF	238-pin ZIF	238-pin	238-pin ZIF	238-pin ZIF	○	238-pin ZIF
Phoenix 1.03	Epson 1.06.1.09	AMI 3/9/93	IBM 9/1/93	AMI 11/11/92	Phoenix EISA 1.01.27-2	NCR 6/14/93	AMI 6/6/92	Phoenix 1.10.01	AMI 11/11/92	AMI 6/6/92	Phoenix 8/2/93
8/128	8/36	16/32	8/64	8/64	16/64	8/64	4/32	10/64	4/32	16/64	8/64
72-pin	72-pin	30-pin	72-pin	72-pin	72-pin	72-pin	30-pin	72-pin	30-pin	30-pin	72-pin
6/4	2/1	8/4	4/3	4/3	4/3	4/2	8/4	4/2	8/4	8/4	4/2
256/256	0/0	256/256	0/256	256/256	256/256	64/256	256/256	0/1024	256/256	128/256	256/256
tower	compact	desktop	minitower	compact	tower	minitower	desktop	tower	compact	minitower	desktop
0/2	0/1	0/0	0/2	0/2	0/2	0/2	1/2	1/3	0/1	1/1	1/1
1/0	0/0	0/0	1/0	0/0	1/2	2/0	0/0	0/0	1/0	0/0	0/1
0/4/0	0/4/0	0/4/0	0/7/0	0/5/0	6/0/0	0/4/0	0/4/2	0/7/0	0/3/2	0/4/1	0/5/1
3PCI/2	0/0	2VLB/0	0/0	0/0	2VLB/0	2VLB/1	2VLB/0	0/0	3VLB/1	2VLB/0	2VLB/1
Digital RC268-E	Conner CP30344	Micropolis 2112A	WD Caviar 2420	WD Caviar 1170	DEC DSP3105	WD Caviar 2340	WD Caviar 2250	Seagate ST3243A	Seagate ST3290A	Maxtor 7245AT	Seagate ST3655A
1024	344	1024	420	170	1024	340	250	214	260	245	528
integrated SCSI	integrated IDE	2MB Promise DC-4030 VL	integrated IDE	integrated IDE	UltraStor Ultra 34F VL-Bus SCSI	integrated IDE	2MB Promise DC-4030VL	integrated IDE	Tangent VL-Bus Multi I/O	1MB Promise DC-4030VL	integrated IDE
1.2, 1.44	combo	combo	1.2, 1.44	1.44	1.2, 1.44	1.44	1.2, 1.44	1.44	1.2, 1.44	1.2, 1.44	1.2, 1.44
Diamond Viper VLB	integrated	Diamond Viper VLB	integrated	integrated local bus	ATI Graphics Ultra Pro	Diamond Viper VLB	Genoa Windows VGA 8500VL	integrated	Actix ProStar VL	Cardex W32 32-bit VL-bus	Diamond Viper VLB
2/0	1/0	2/0	0/1	1/0	2/0	2/0	0/1	0/1	0/1	1/0	1/0
Digital VRC-16	Epson color	Mag MX17F	IBM PS/1 HiFunction MS	CTX CVP-5468NI	Morse MCM 1730	NCR color	OEM	Tandy VGM-450[3]	Axxis CM-1430	Socos DCM-1568	Zeos color SVGA
16/.26	15/.28	17/.26	14/.28	14/.28	17/.26	15/.28	14/.28	14/.28	14/.28	15/.28	14/.28
n/a	n/a	n/a	14.4/14.4	n/a	14.4/14.4	n/a	n/a	n/a	n/a	n/a	n/a
○	○	LaserWave Supra 16	○	○	○	○	○	○	○	○	○
○	○	Panasonic CR-562B	○	○	○	○	○	○	○	○	○
n/a	n/a	300	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1/2/1/0/0/1	1/2/1/0/0/0	1/2/0/1/1/0	1/2/1/0/0/0	1/2/1/0/0/0	1/2/0/0/0/1	1/2/1/0/0/0	1/2/0/1/0/0	1/2/1/0/0/0	1/2/0/1/0/0	1/2/0/0/0/0	1/2/0/0/0/0[4]
36	12	12	12	12	12	36	12	12	12	36	12
●	●	●	●	●	●	●	●	●	●	●	●
free	free[6]	[7]	○	free[6]	$25	free	$75	$129	free	○	$49
2	○	1	1[8]	3	1	1	2	2	2	2	2
11.5	12	10	24	24	10	24	10	8[9]	11	9	24
○	○	○	●	●	○	●	●[10]	○	●[10]	○	●
●	●	○	●	○	○	●	●	○	●	●	●
●	●	●	●	●	●	○	●	●	●	●	●

[6] On-site service within 24-hours. [7] Depends on location. [8] In continental United States. [9] Not toll free. [10] Saturday only.

MEET
ELOQUE

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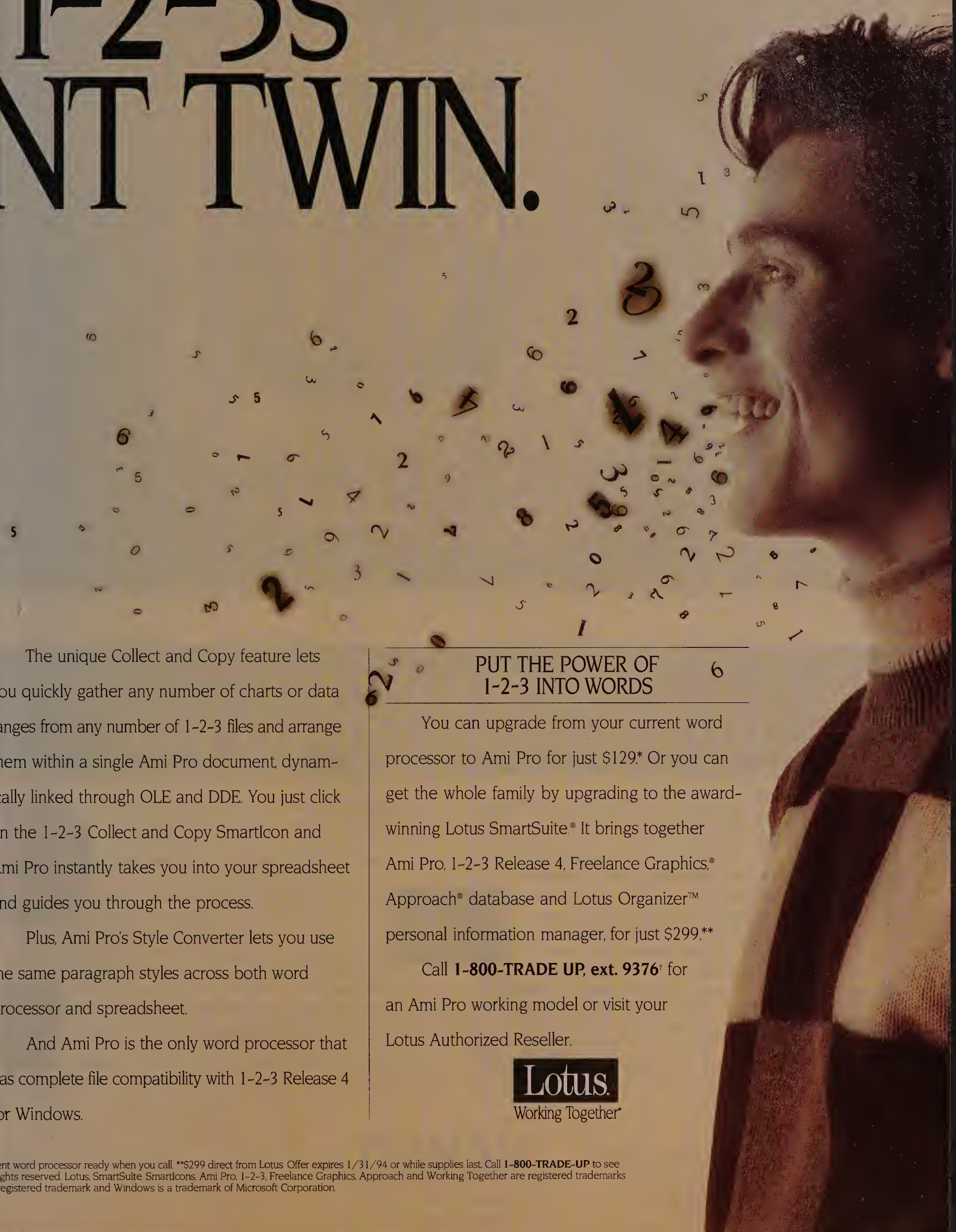
1-2-3's
NT TWIN.



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SO ADVANCED IT EVEN TURNS ITSELF OFF.

PC MAGAZINE EDITORS' CHOICE
September 14, 1993
FlexScan F550i-W

1993 W 100 WINDOWS MAGAZINE ANNUAL WIN AWARD
FlexScan F550i

Nanao, the technical leader in monitors has done it again. In addition to being the top choice of today's CAD/CAM, DTP and Windows users, Nanao's award-winning FlexScan monitors now have a remarkable energy-saving system – PowerManager.

PowerManager works with all green computer systems including VESA DPMS (Display Power Management Signaling). But users don't have to own a new green computer in order to take advantage of the PowerManager to save energy. Our PowerManager works with any existing PCs with a screen saver software, including Windows 3.1 and After Dark. Activating when the blank screen of the screen saver appears, PowerManager cuts operating power to less than 8% of total consumption. It also automatically powers the monitor down to a stand-by mode when the computer is turned off. The PowerManager can save users as much as $63 per year on utility bills (Source: E Source). PowerManager has placed Nanao at the forefront of the Environmental Protection Agency's Energy Star Program.

PowerManager is now the standard feature of our 15", 17", 20" and 21" monitors. All Nanao energy-saving monitors feature superior Invar Shadow Mask and Trinitron CRTs with non-flicker ultra-high resolution. Their ergonomic features include compliance with MPR-II/TCO low radiation emission standards and anti-reflective treatments. Best of all, they can power down. So when you're not working, neither are they.

Nanao FlexScan monitors. Intelligently designed. Incredibly useful. And now, built to help protect our environment by reducing energy consumption.

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Circle 194 on reader service card

Win a Zeos 486DX2-66

Have you ever contacted your PC maker for service and support? Or has your PC been trouble-free? Tell us about it! Fill out and fax in the questionnaire below—even if you have no problems to report, and even if you have responded to this survey before—and we'll enter you in a drawing to win a Zeos 486DX2-66, a Best Buy featured in this month's system review.

HOW TO ENTER: Fax your completed questionnaire to *PC World* at 415/974-7367. If you have trouble connecting to this number, fax your survey to 415/974-7404 or 415/442-1891. Do NOT fax a cover page. If you don't have a fax machine, you can mail your survey to Fax Survey, Box 2-SS, *PC World,* 501 Second St. #600, San Francisco, CA 94107. Send your survey in no later than February 28.

HOW TO FILL OUT THE FORM: Clearly print your name (use block capital letters) and your fax number at right; fill the appropriate circle for each digit of your daytime phone number. Then fill out the rest of the questionnaire. WHEN FILLING THE CIRCLES, AVOID GOING OUTSIDE THE LINES! One entry per person per month. Void where prohibited by law.

LAST, FIRST NAME

FAX NUMBER — —

ZIP CODE

Please fill in your daytime phone number below.

1	○	○	○	○	○	○	○	○	○	○
2	○	○	○	○	○	○	○	○	○	○
3	○	○	○	○	○	○	○	○	○	○
4	○	○	○	○	○	○	○	○	○	○
5	○	○	○	○	○	○	○	○	○	○
6	○	○	○	○	○	○	○	○	○	○
7	○	○	○	○	○	○	○	○	○	○
8	○	○	○	○	○	○	○	○	○	○
9	○	○	○	○	○	○	○	○	○	○
0	○	○	○	○	○	○	○	○	○	○

ABOUT YOUR PC

Who is the manufacturer of the PC you use most frequently?

○ Acer ○ Acma ○ ALR ○ Ambra ○ Apple ○ Ares ○ AST ○ Austin ○ Axik ○ Blackship ○ Canon ○ Compaq ○ CompuAdd ○ Compudyne ○ Comtrade ○ Cornell ○ CSP ○ DEC ○ Dell
○ Diamond ○ DTK ○ Epson ○ Everex ○ Gateway 2000 ○ Grid Systems ○ Hertz ○ Hewlett-Packard ○ Hyundai ○ IBM ○ Image ○ Inmac ○ Insight ○ International Instrumentation ○ Leading Edge ○ Micro Express ○ Micron ○ MIS
○ Mitac ○ NCR (AT&T) ○ NEC ○ National Micro ○ Northgate ○ Packard Bell ○ Panasonic ○ PC Brand ○ Pionex ○ Polywell ○ Quill ○ Samsung ○ Sharp ○ Swan
○ Tagram ○ Tandy ○ Tangent ○ Texas Instruments ○ Toshiba ○ Tri-Star ○ Twinhead ○ Unisys ○ USA Flex ○ VTech (Expotech, Laser) ○ Wang ○ Wyse ○ Zenith ○ Zeos ○ No-name clone
○ Other (Specify first 7 letters)

Is this PC a...?
○ Desktop ○ Notebook/laptop ○ Hand-held

Is this PC a...?
○ Pentium/586 ○ 80486 ○ 80386 ○ 80286 ○ Other (specify): _____

Where did you purchase this PC?
○ Local dealer ○ Mail/phone order ○ Direct from field sales force ○ Membership discount store ○ Computer superstore ○ Home/electronics store ○ Retail store ○ VAR ○ Other (specify): _____

When did you buy this PC?
○ This month ○ 1–3 months ago ○ 4–6 months ago ○ 7–12 months ago ○ More than 12 months ago ○ Not sure

Would you buy this brand of PC again?
○ Yes ○ No

Do you use this PC at...?
○ Work ○ Home ○ Both

In terms of PC skills, would you describe yourself as...
○ Novice ○ Intermediate ○ Experienced

WHAT ARE YOU REPORTING? (Check only one.)

○ No problems ever
○ No problems since last responded to survey
○ A problem since last responded to survey
○ An older problem not previously reported in this survey

If you're NOT reporting a problem, please fill out the Uptime Report (below).

To REPORT a problem, fill out the Problem Report (right column).

UPTIME REPORT

How many consecutive months has your PC been trouble-free?
○ 3 months ○ 6 months ○ 9 months ○ 12 months ○ 15 months ○ 18 months ○ More than 18 months

■ **STOP HERE if you're not reporting a problem.**

PROBLEM REPORT

When you first received your NEW PC, was any component "dead on arrival"?
○ Yes ○ No ○ Don't know

If so, which one was it? (Check all that apply.)
○ Battery ○ CD ROM ○ CPU ○ Floppy drive
○ Graphics/video board ○ Hard drive ○ Keyboard ○ Memory
○ Modem/fax board ○ Monitor/screen ○ Motherboard ○ Mouse
○ Power supply ○ Sound board ○ Other

■ **For the following questions, describe your most recent HARDWARE-related problem with this PC.**

Did you contact the manufacturer for repair service or technical support?
○ Yes ○ No ○ Not sure

What was this problem finally identified as?
○ Faulty component ○ Incorrectly installed software ○ Wrong configuration ○ Faulty peripheral ○ Device conflicts ○ OS problem ○ Other ○ Don't know

If a component failed, which one was it? (Check all that apply.)
○ Battery ○ CD ROM ○ CPU ○ Floppy drive
○ Graphics/video board ○ Hard drive ○ Keyboard ○ Memory
○ Modem/fax board ○ Monitor/screen ○ Motherboard ○ Mouse
○ Power supply ○ Sound board ○ Other

How many times have you had a problem with this PC?
○ This was first time ○ Two ○ Three ○ Four ○ More than four

Did the problem occur under warranty?
○ Yes ○ No ○ Not sure

How recently did this problem occur?
○ This month ○ 1–3 months ago ○ 4–6 months ago ○ 7–12 months ago ○ More than 12 months ago ○ Not sure

How long after PURCHASE did this problem occur?
○ Less than 1 month ○ 1–3 months ○ 4–6 months ○ 7–12 months ○ More than 12 months ○ Not sure

■ **For the following questions, describe your most recent SERVICE or SUPPORT experience.**

What type of service/support did you receive?
○ Phone ○ On-site ○ In-store help ○ Express system swap ○ Express component swap ○ Factory return

If phone service, how long were you on hold?
○ Not at all ○ Less than 1 min. ○ 1–2 min. ○ 2–5 min. ○ 5–10 min. ○ 10–20 min. ○ More than 20 min.

How long did it take before you talked to the person who finally helped you?
○ Less than 1 hour ○ 1–24 hours ○ 1–2 days ○ 3–5 days ○ 1 week ○ More than 1 week

How long did it take to resolve the problem completely?
○ Less than 1 week ○ 1–2 weeks ○ 3–4 weeks ○ More than 1 month ○ Never resolved

Was the problem resolved to your satisfaction?
○ Yes ○ No

Based on the service and support you received, would you buy this brand of PC again?
○ Yes ○ No

On the whole, how satisfied were you with the service and support you received?
○ 1 ○ 2 ○ 3 ○ 4 ○ 5
Not at all — Satisfied — Extremely satisfied

How likely is it that you would recommend this brand of PC to a friend or colleague?
○ 1 ○ 2 ○ 3 ○ 4 ○ 5
Not at all — Likely — Extremely likely

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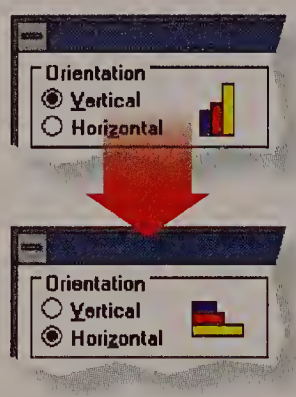

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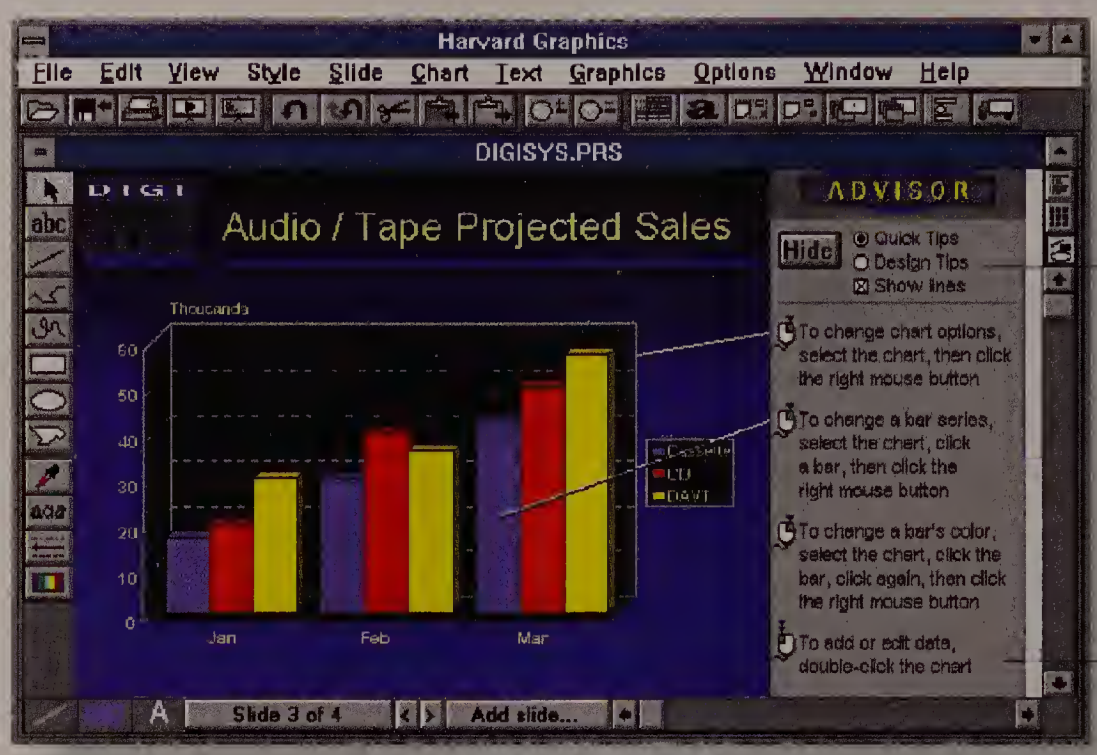

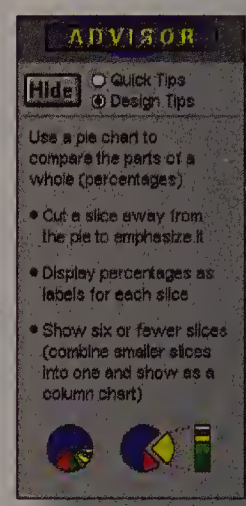

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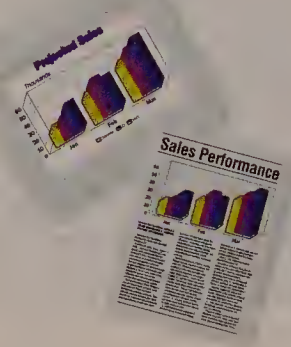

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December 1993

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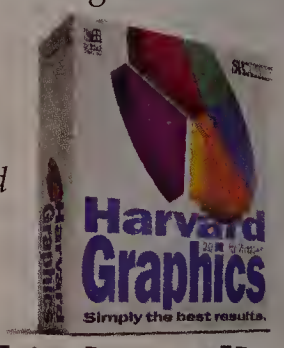
October 11, 1993



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PC meets TV

By Daniel Tynan

Will PCs and TVs merge on the information highway, letting PC users juggle numbers inside a spreadsheet, dial up a cross-country videoconference, then hot key to CNN or QVC? And what roadblocks lie around the bend?

It's morning in the year 1999. As you sit in the kitchen sipping coffee, you turn on the PCTV and receive a personalized electronic newspaper filled with information on preselected topics—international finance, stock quotes and interest rates, plus video highlights of President Schwarzenegger's State of the Union address.

On the bullet train to work, you pull out your palmtop computer and receive an E-mail message saying that your 9 a.m. appointment has been canceled. At the office you attend a video teleconference and send a 30-minute slide presentation

ILLUSTRATION: JEFF BERLIN; PHOTO: JOE LINTON

to the sales office in Milwaukee without leaving your desk.

At night you relax by dialing up *Gone With the Wind* on the interactive movie channel, only instead of watching Clark Gable and Vivian Leigh, you and your spouse watch digitized images of yourselves in their roles. And in this version, Rhett really does give a damn—or Scarlett shoots him in the back.

Welcome to the information superhighway.

Over the past year, the so-called superhighway has become the hottest topic in corporate America. Hardly a day passes without news of some merger, acquisition, or alliance that will bring the highway a few feet closer to your door. Cable giant TCI merges with regional phone company Bell Atlantic; Viacom and QVC squabble over Paramount; high-tech heavyweights like Microsoft and Intel cozy up with cable-box provider General Instrument. Everyone is anxious for a toehold in what promises to be a multibillion-dollar market.

The information superhighway could be the biggest leap in human communications since Sputnik...

An Elephant in the Making

But what is the information superhighway? And what will it mean for people who use PCs? The answers to these questions are as varied as the would-be players. Depending on whom you talk to, the highway could be the biggest leap in human communications since Sputnik, or simply more sour cream and chives for America's couch potatoes.

In theory, the information superhighway will be a high-speed data network, linking virtually everyone in the country to everyone else. But when you get down to specifics—how the highway will be built, what services will be on it, and how people will access it—things get a little slippery.

The data highway "is an elephant," says Amy Pearl, a staff engineer for Sun Microsystems in Mountain View, California, and a member of Computer Professionals for Social Responsibility (CPSR). "Let five blind people touch it, and each one will describe something different."

There are a couple of reasons for the highway's shifting appearance: It won't be one network but several, each with its own technology and uses. And the highway is still mostly unpaved, with plenty of questions remaining about the direction it will take.

For desktop PC users, the highway will probably look a lot like existing services, only richer—with E-mail connections to tens of millions of people and access to sound and full-motion video as well as text. But this highway has the potential to go where no data has gone before: into the homes of millions of people who don't own PCs. That's because you'll also be able to access it via "intelligent" devices that attach to your TV or phone line, or even via wireless gadgets that fit into the palm of your hand.

The information that travels along this highway will be just as varied, from 500-plus channels of cable programming to electronic newspapers to video phone services. The potential for widespread participation is enormous, but the reality may be something far less revolutionary. Some observers warn that without prodding from the federal government, the huge corporations building the highway aren't likely to pay for a universally accessible, fully switched network—one where any individual on the network can communicate with anyone else. Many PC users already have this kind of person-to-person access, thanks to a host of online services. The question is whether the millions of non–PC users will enjoy similar access using devices such as their TVs.

"Some people believe that information will become the basis of our economy," says CPSR's Pearl. "It's critically important that we not become a society of the information rich and information poor."

...or it could simply be more sour cream and chives for America's couch potatoes.

Everything's Coming Up Digits

PC technology is behind many of these radical changes. Today's microprocessors now have the horsepower to handle huge amounts of information—such as audio and video data—for a relatively low cost. And advances in miniaturization allow manufacturers to squeeze a computer into almost any kind of device.

At the same time, all kinds of analog data—TV broadcasts, newspapers, phone calls—are going digital, taking advantage of compression techniques that increase both the amount and the quality of information. Data that's already digital is also getting richer, adding multimedia capabilities, such as sound and full-motion video, to plain old ASCII text.

There's one problem, however: Try to add all this data to today's phone and cable networks, and you end up with a massive traffic jam. Telephone networks excel at managing two-way communications, but they weren't built to handle this heavy a load. Coaxial cable systems, for their part, can pipe huge amounts of data into your living room, but their two-way capabilities are minimal at best.

"Today we have PCs, information services, cable TV, and switched telephony, but we're missing the ability to network all of that, to make it broadband, two-way, ubiquitous, and affordable," says Bill Weiss, vice president of public relations for AT&T's multimedia products and services division in Basking Ridge, New Jersey. "That's a tall order."

Hence the calls for the creation of a national information infrastructure—or information superhighway—that can handle all this digital data. Part of that infrastructure is already here in the form of the Internet and existing wireless and fiber-optic networks, but building the rest of the superhighway will take several years and hundreds of billions of dollars.

Most of the infrastructure will be put into place without consumers ever being aware of the massive construction effort that is under way. Instead, what you're likely to see is a gradual increase in the number and variety of cable channels and data services available in your area and the introduction of a jumble of devices that let you access these services.

Information Appliances for the Digital Age

For years PCs have been the gateway to online information. Now they're being joined by a host of other gadgets—personal digital assistants (PDAs), screen-based phones, and "smart" cable boxes—that will also be used to access digital data. With their own CPUs, operating systems, and unique user interfaces, these info appliances prom-

Visionaries Picture the Superhighway

We asked some of the movers and shakers for their view of the information superhighway. Here is what they had to say:

Videoconferencing and video on demand will fund the building of the highway. But when I think of opportunity, I think of an incredible breadth of applications, in areas like medical diagnosis or education. I think that when people are empowered to get access to information on these networks, it will have profound, positive effects for every area of work and home life.
—William Gates, chair and CEO, Microsoft

The digital superhighway is much more than a highway system. It's actually the construction of an entirely new virtual continent in which the highway runs. In the future, we will live part of our lives in cyberspace, in the world of virtual reality. We could bequeath few gifts to future generations more important than getting this right. It's critically important to balance public and private interests, much as it's very important to do so in land use, where even private landowners have certain obligations to the public."
—Jaron Lanier, "father" of virtual reality

A full-access universal network is really what we're talking about—broadband, fully interactive, bidirectional, and universally available. I see it happening in the next three to five years.
—John C. Malone, president and CEO, TCI

This information highway is going to take its place among other important home appliances: the telephone, the computer, the VCR, the stereo, and yes, the radio. Why? Because there is no substitute for being there, out there, working, traveling, mingling, greeting, meeting, learning...as Lyndon Johnson used to say, pressing the flesh.
—Michael D. Eisner, CEO, Walt Disney Company

It's the kitchen sink condensed into one home-office mobile apparatus that is connected to the world by the various technologies—a multimedia device as simple as your remote control. It will revolutionize and expedite the educational process, free up valuable land that can be restored to its natural state, reduce the frequency of ground and air travel (and thus pollution), and deliver three-dimensional pictures and sound, enabling people to spend less time doing mundane things and more time thinking.

I hope our country stays on top of this one! I hope we are the inventors, the builders.
—Shelley Duvall, Think Entertainment

All this may seem more like science fiction than reality. Indeed, in the history of the world, it has been only a few hundred years since gunpowder transformed human warfare and less than a century since television connected the world. But just as those inventions brought us to the twentieth century, so will digital information transmit us into the next, transforming everything from how we learn to how we work.
—Albert Gore, vice president of the United States

The digital superhighway will be as important an underpinning for the new global economy as the interstate highway system, international jet airports, television, and the telephone system were for the industrial age.
—John Sculley, chair and CEO, Spectrum Information Technologies

As we are poised to cross the threshold of a new century, Time Warner Cable's vision is an electronic superhighway into the home. Customers will have access to a wide range of entertainment, information, education, and communication services.
—Gerald Levin, chair and CEO, Time Warner

—Leslie Crawford

PHOTOS: (TOP ROW) ALAN LEVENSON; JEFFREY ARMSTRONG/VOYTILL; ALAN LEVENSON; ROBERT ROSENBLUM; (BOTTOM ROW) ROBERT ROSENBLUM

ise to be cheaper and easier to use than desktop PCs, though also more limited.

PDAs: The Incredible Shrinking PC PDAs are turning from electronic Day-Timers into wireless communications devices that let you link up with a highway in the sky. The key is a credit-card–size communications module, like Motorola's NewsCard, that plugs into the PCMCIA slot in Apple's Newton MessagePad or the Tandy/Casio Zoomer. The NewsCard alerts you to pager signals and displays top news stories from Reuters and *USA Today* on the hand-held's LCD screen. You can even receive binary files and E-mail via the Internet.

Because it relies on pager technology, a typical PDA's two-way capabilities are limited. Not so with Simon, the combination cellular phone and personal assistant developed by IBM and BellSouth. This $899 unit looks like a normal cellular phone but sports an LCD between the receiver and the mouthpiece. Besides its cellular phone capabilities, Simon lets you send and receive pages, faxes, and E-mail. You can tap on icons to call up your calendar and address book, use a stylus to make handwritten notes in electronic ink (Simon provides no handwriting recognition), or punch in letters on a touch-screen keyboard. In other words, you could receive a fax document, make notations on it, and fax it back—all while waiting on the corner for a cab.

Smart Phones This year a number of companies plan to introduce *smart phones*, devices that let you call your mother, catch up on the news, check stock prices, and pay your bills using the device's built-in LCD and touchpad. According to Jupiter Communications, a consumer information consulting firm in New York, several companies will begin offering such phones for $100 to $500 later this year, with the initial focus on home banking and shopping services. Apple is also rumored to be working on a smart phone based on the Newton, though the company declined to comment on its plans.

"The value of the phone is underestimated," says Gene DeRose, Jupiter vice president. "We think it will become increasingly applicable for all data."

While the first smart phones will feature a text-only data screen, subsequent models are expected to add capabilities for graphical color interfaces and full-motion video.

TV on Steroids The appliances that have been getting the most attention are *set-tops*—the boxes that sit on top of TVs and unscramble the cable signal. Next fall, General Instrument plans to introduce a set-top containing an Intel 386 microprocessor and an operating system designed by Microsoft. Around the same time, Scientific-Atlanta, Motorola, and Kaleida (a joint venture of IBM and Apple) plan to roll out set-tops of their own.

Most set-tops will be purchased and distributed by the cable companies—whichever box your cable provider buys is the one you'll get. But eventually you'll be able to buy your own set-top in a consumer electronics shop. Silicon Graphics, 3DO, HP, and Toshiba are among those planning to retail set-tops. Such boxes are expected to offer 3-D graphics, access to specialized interactive services, and other advanced features. They'll sell for $500 to $700.

"We believe that the top of the TV set is the second-most-important piece of real estate, after the top of the desk," says Avram Miller, vice president of corporate business development for Intel in Santa Clara, California.

Unlike standard cable boxes, which do little more than decode the cable feed, smart set-tops will come with built-in chips for receiving 500 or more digitally compressed channels of pay-per-view movies, home shopping shows, and interactive games. Built-in software will help you navigate those channels and interact with programs.

Microsoft's set-top interface will be "based on Windows technology," says Karl Buhl, spokesperson for Microsoft's advanced consumer technology group, but it won't bear much resemblance to Windows. "Instead of a screen loaded with lots of buttons, you'll see very simple graphic overlays" on top of existing programs. Viewers will be able to select programs by category (such as news or children's shows), "rent" movies, buy that gold lamé jumpsuit, or spin the wheel with Vanna—all with a few clicks of the remote.

I Want My PCTV Personal computers are going through a metamorphosis, incorporating more and more TV-like features. Last fall, for example, Apple unveiled the Macintosh TV—a midrange Mac with a built-in CD ROM–audio player and a cable-ready color TV for $2079. Users can juggle numbers inside a spreadsheet, then hot key to CNN for a live news broadcast. Are PCs and

If They Build It, These Will Come

Corporate America has been hard at work dreaming up uses for the superhighway of the future. Here's just a sampling of what you're likely to see.

Dial-a-Face Once fiber-optic lines are in place, the data highway should be wide enough to send full-motion video from any one point to any other. You'll be able to make face-to-face phone calls and conduct video teleconferences.

The World's Biggest Library You'll have online access to vast amounts of information, whether it's stored in the local library, a specialized technical database, or the Library of Congress.

News You Can Use A custom electronic newspaper can be delivered to your computer or TV screen, containing news and video clips on subjects you're interested in.

Schools Without Walls Electronic classes should make it possible for individuals to pursue lifelong education and for businesses to provide low-cost employee training.

Pass the Popcorn A big chunk of the 500-plus channels beaming into your living room will be consumed by round-the-clock pay-per-view movies, concerts, sporting events, and reruns of top-rated TV shows.

Let the Games Begin Interactive shows will let you play along with "Jeopardy" contestants, while video game subscription services will deliver Sonic the Hedgehog to your door. Some will let you compete against multiple players across the country.

The Virtual Mall Shopping, banking, and other transactions will be as easy as pressing a button on your remote or keyboard and entering an ID number.

Ads Nauseam Advertising is also going interactive. When you watch a commercial for, say, a Mazda Miata, you'll be able to click a button to get more information or set up an appointment with your local dealer for a test drive.

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Circle 75 on reader service card

Do You Know the Way to CNN?

To enter the digital highway, you need a device with extra brain power—a so-called information appliance. Your choices fall roughly into four categories.

TV with set-top box
The digital highway will pass through millions of living rooms via a computerized box that sits on top of the TV and plugs into a cable or phone network. At first, you'll select programs and products using a simple hand-held remote; later, you may be able to attach a keyboard for sending E-mail, or a camcorder for making videophone calls.

Screen-based phones
Phones are getting smarter, offering advanced features like caller ID, voice mail, faxing, and access to shopping and banking services via a built-in text screen. Some models will sport a credit card reader and ports for plugging in a keyboard or printer. Eventually they'll include more advanced screens and cameras for video.

PDAs and personal communicators
Professionals on the go can download wireless news and stock services, respond to pages, make phone calls, and send and receive faxes and E-mail from virtually anywhere.

PCTVs
For one-stop information shopping, many will turn to PCs that combine a multimedia computer with a TV set and/or phone, making it equally easy to dial up CompuServe, CNN, and your colleague across the country.

set-tops fighting for the same turf?

"We don't see set-tops replacing PCs," notes Intel's Miller. "They're more complementary." Most likely, many people will end up with several information appliances—a PC on the desk, a set-top in the living room, a PDA on the road—and use each one in slightly different ways.

The Soul of the New Appliances

Regardless of which appliance people choose to access the network, everyone agrees that the hardware must be much easier to use than PCs are today.

"Consumers want ease of use and reliability," says Gordon Mayer, president of GeoWorks. The Berkeley, California, firm created the system software for the Zoomer PDA and is designing operating systems for other PDA and set-top manufacturers. "There are things PC users have learned to live with—like lugging around a portable that runs out of battery on one flight across the United States. People who buy [a PDA] are not going to put up with that."

Interface design is also crucial. Even Windows, credited by many with making PCs easier to master, is far too complex for the average consumer. "Consumers have no interest in learning the mechanics of the operating system—it has to be mindlessly simple," says Microsoft's Buhl.

Detours and Roadblocks

The superhighway's potential is impressive, but the path to digital nirvana is studded with potholes, detours, and roadblocks.

The first barrier is cost. The price for linking all the neighborhoods via fiber-optic lines and providing high-speed computers for handling all the information is estimated at hundreds of billions of dollars. Whether the federal government should subsidize construction or leave the job to private industry is still being debated.

"It's a red herring to say that the government could build it," says Daniel Weitzner, senior staff counsel for the Electronic Frontier Foundation (EFF), a public policy group in Washington, D.C. Weitzner and others believe the private sector should build the superhighway and that government funds should go toward ensuring that everyone has access to the information.

Meanwhile, individual companies are steaming ahead with plans to wire the nation with fiber. Last fall, Pacific Bell announced a $16 billion plan to string fiber to 5 million California homes by the year 2000. Similar plans have been unveiled by New Jersey Bell, TCI, and others. Because the infrastructure is being built region by region, consumers in some parts of the country will have access to the highway long before others.

The next question mark is content. Faced with the prospect of a massive network capacity and little to fill it, cable operators, telephone companies, and other media conglomerates are scrambling to scoop up any existing programming they can find. A case in point: Viacom's and QVC's recent battle to buy Paramount.

"What they're looking for is Paramount's library of old movies and TV shows," says Sharon Kalin, president of the New York arbitrage firm Athene-Coronado Management.

This kind of thinking is based on the traditional TV model of mass broadcasting—a model that many information activists believe is flawed.

"The big firms talk about 500 channels, video on demand, and home shopping—the old paradigm continued on page 147

"The top of the TV is the second-most-important piece of real estate after the top of the desk." —AVRAM MILLER, INTEL

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of delivering a product to passive consumers who interact with it by spending money," says Howard Rheingold, author of *The Virtual Community—Homesteading on the Electronic Frontier*. "If we want this to be a democratic medium, the government has to tell big companies, 'You must enable public discussion across your networks.'"

That's why groups such as EFF and CPSR are lobbying Congress and the Clinton administration for a new Federal Communications Act to ensure universal public access to the data highway, similar to that currently provided by phone companies.

The result, says Rheingold, would be "a small greenbelt of community-based networks," where people could create information services and multimedia titles, then distribute them to a select audience. Government and industry officials anticipate that thousands of homegrown businesses could spring up along the digital roadside.

Standards Confusion, Privacy Concerns

Then there are the technological hurdles. There are no agreed-upon standards for compressing data, transmitting it, and making it compatible with the various info appliances. That $500 set-top you buy at Radio Shack, for example, might not work with an interactive version of MTV. Compatibility issues for the digital highway could make the standards battles of the early PC industry look like a square dance.

Other roadblocks involve issues of privacy and security. Network operators will need to prevent hackers from accessing credit card numbers and other personal information. One method favored by EFF and others is to remove government restrictions on the use of data encryption. "Access to high-quality cryptography is essential for individuals to protect their privacy on these networks," says Weitzner.

Finally, there's the problem of how to sift through the massive amounts of new information. You will need tools such as software "agents" that you can program to seek out the information you want and discard the rest or even to suggest new services based on your preferences. But even these tools may not be enough.

"With tens of thousands of new services, it will be even harder to rise above the noise," notes Gary Kaye, technology producer for ABC's "World News Tonight." "A lot of them will end up as road kill."

Evolution, not Revolution

In some ways the data superhighway is already here. Most of the changes coming in the next five to ten years will concern the amount and type of data and the ways it will be delivered.

The payoff for PC users will be access to more, and more diverse, information. As with desktop publishing, individuals and small businesses will be able to perform feats previously limited to big organizations—send massive data files to far-flung clients, conduct video telemeetings, or train employees sitting in front of a PC or TV.

But the data highway may have its most profound impact on people who don't yet have an Internet address stamped on their business cards. How it will affect these non–PC users will hinge on which direction the highway takes.

"A lot of people are interested in the superhighway primarily as another way to get entertainment products into people's homes. They want to sell something," says CPSR's Pearl. "Another view is the information highway as the global library....It's not just that something should exist to make money. There's nothing wrong with looking at the opportunity for companies, but you also have to look at more basic needs, such as education."

PC World *contributing editor Daniel Tynan lives in fear of his television. Leslie Crawford is a San Francisco–based freelance writer.*

High Tech Takes the High Road

The list of companies involved in building the information superhighway reads like a who's who of the PC industry. Here are some of the notables:

America Online Provides wireless access to online services via Tandy/Casio Zoomer and Apple's Newton PDAs.

Apple In addition to the Newton, Apple recently released the Macintosh TV, a midrange Mac with a built-in CD player and TV set, and is rumored to be developing a screen phone based on Newton technology.

AT&T The mother of all phone companies has ambitious plans for providing a nationwide network of storage devices for digitized movies, TV shows, and other programming via its NCR subsidiary. AT&T also plans to lease fiber-optic network and billing operations to other service providers. The company makes a personal communicator–PDA through its Eo subsidiary; owns 20 percent of the ImagiNation Network, an online games service; owns EasyLink E-mail service; sells video phones through consumer retail outlets; owns part of game technology vendor 3DO; is developing a multiplayer game device with Sega; and owns one-third of McCaw Cellular Communications.

DEC Digital Equipment makes video servers and manages billing operations for satellite broadcast services.

GeoWorks Makes the operating system and the interface for the Zoomer PDA and is working with a number of other manufacturers of PDAs and set-tops.

Hewlett-Packard Makes a digital set-top box that works with cable systems.

IBM Designed prototype for Simon personal communications device–cellular phone; coowner of Prodigy online service; builds video servers for tests of interactive TV; rumored to be making set-tops.

Intel Produces CPUs for set-top boxes and video telephony equipment for PCs.

Kaleida This joint Apple-IBM venture has developed a scripting language for making TV programs interactive.

Microsoft Makes the operating system and the user interface for set-tops manufactured by General Instrument and possibly other companies.

Motorola The Power PC chip is the brains of Scientific Atlanta's upcoming set-top box; the wireless communications giant also makes PCMCIA pager cards for PDAs.

Prodigy Announced plans to be accessible via cable TV channel and will start sending multimedia data to TVs and PCs.

Silicon Graphics Builds high-capacity video servers; announced plans to build advanced set-tops with 3-D graphics.

Tandy Codeveloper (with Casio and Sharp) of the Zoomer PDA.

Toshiba Builds set-tops; working with Apple on line of PDAs.

Zenith Builds set-tops and other interactive TV platforms.

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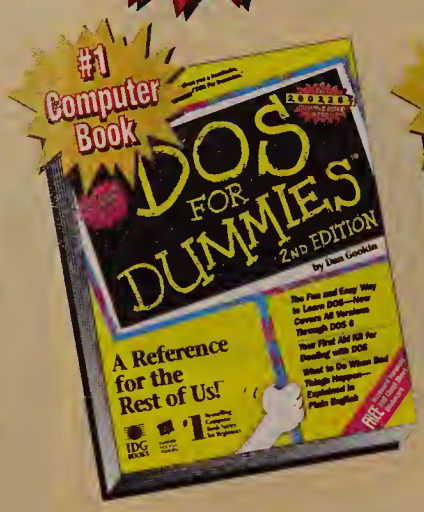

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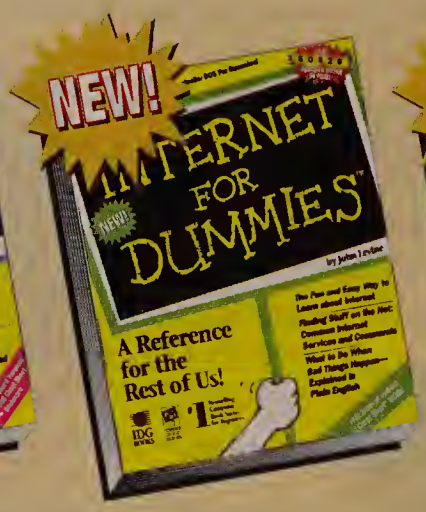

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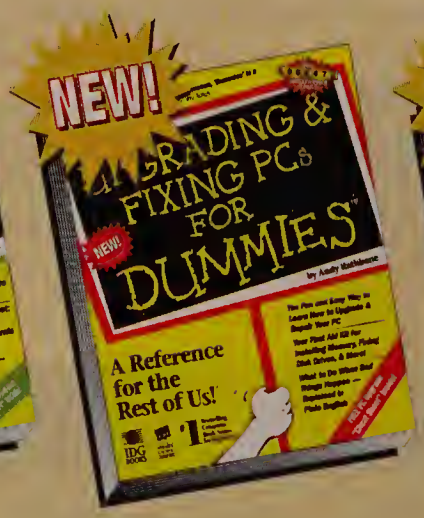

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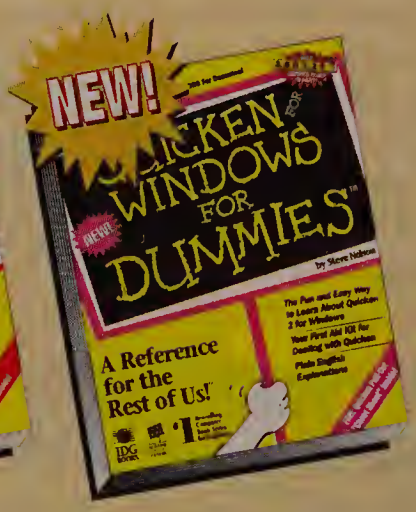

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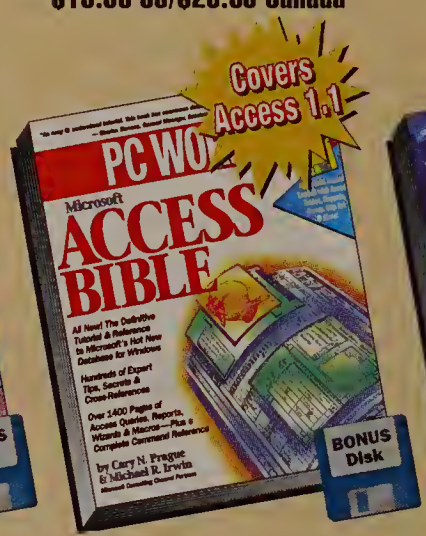

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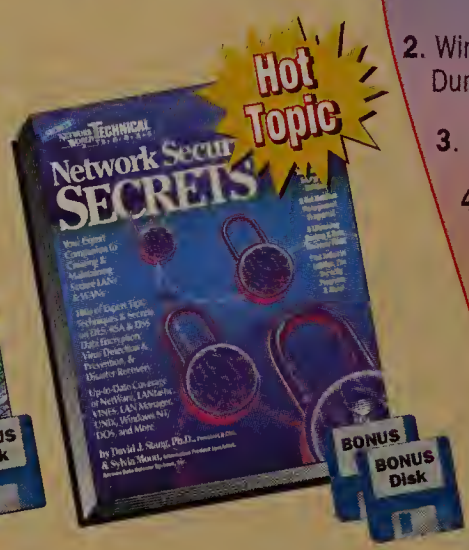

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The four top Windows spreadsheet and analysis packages are among the hottest packages on the desktop. One sells for $99 and the others cost $495.

Should you shell out the extra $400?

Windows Spreadsheets

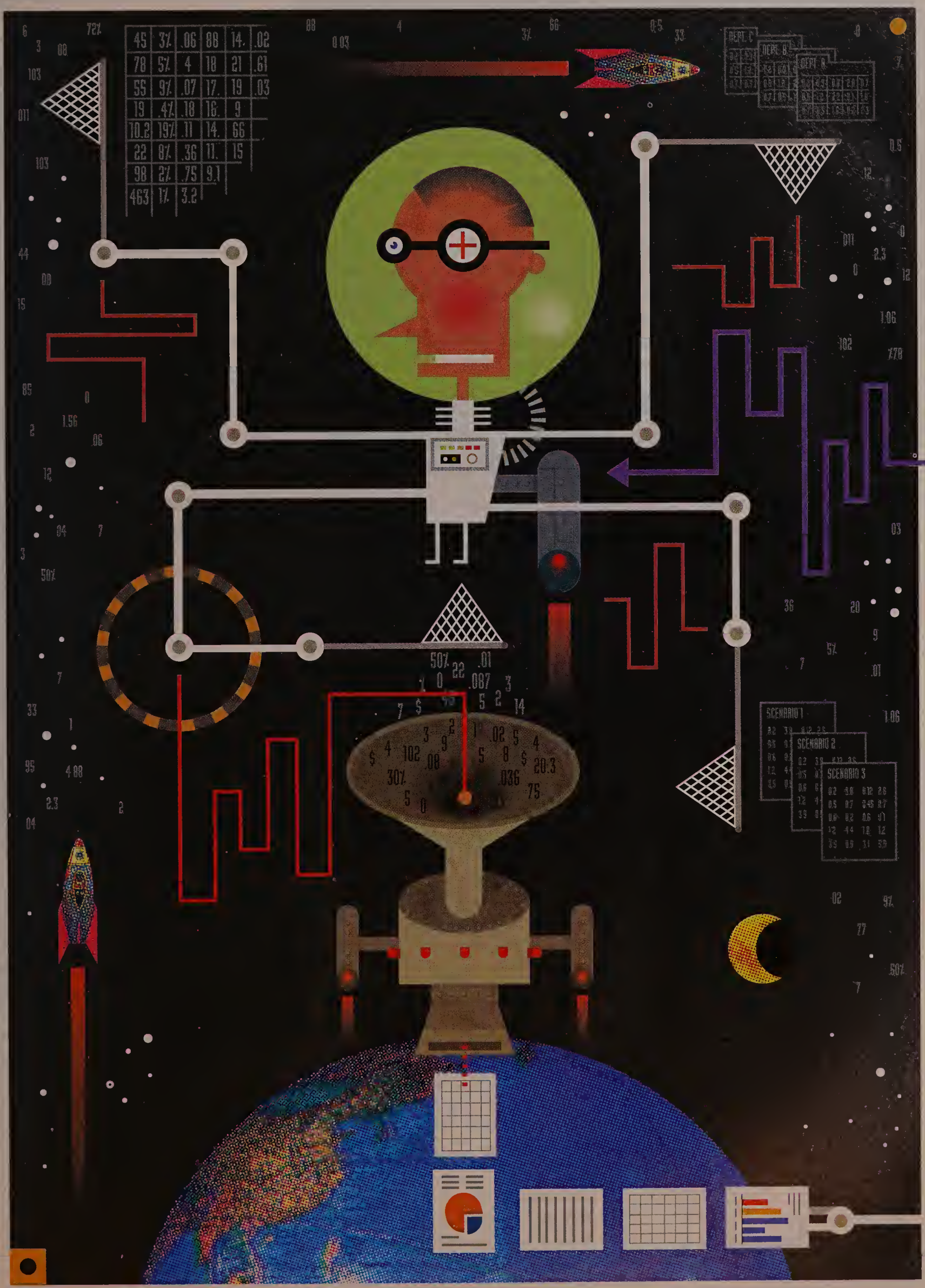
WORLD-CLASS ANALYSIS TOOLS

Snoop around an unfamiliar PC, and there's an excellent chance you'll run across a spreadsheet program tucked away on the hard drive. Spreadsheets have always been popular, and they've become more so as their versatility has increased. Besides being world-class number crunchers, Windows-based spreadsheets now hold their own against some dedicated graphics and drawing packages. They also make excellent substitutes for stand-alone database software. In fact, a Microsoft survey showed that a high percentage of Excel users treat the program as a flat-file database. Spreadsheet functionality continues to expand at a rate that the typical user has a hard time keeping up with.

This roundup will help you determine which Windows spreadsheet best suits your needs—hardly a no-brainer, since this latest crop is radically improved and more feature-filled than ever. Although vendors continue to upgrade their non-Windows spreadsheets, the real action is in the Windows products, which leave their DOS counterparts in the dust when it comes to ease of use and functionality.

Today's Windows-based spreadsheets include sophisticated application development tools that extend well beyond simple macro capability, and some pack specialized analysis

By John Walkenbach



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options for statistical and engineering applications. For work-group settings, flexible scenario-management tools and even E-mail are accessible directly from the spreadsheet environment. The end result? Spreadsheets can now manipulate and analyze more information, better than ever before. They give you the tools to pull almost any set of data into a familiar environment and then work with that data more intelligently.

Perhaps the most significant trend in spreadsheets is in multidimensional data modeling, which lets you view and summarize information in a database table in ways you may have never dreamed possible. Lotus Improv sets the standard, and Improv-like features now appear in the latest versions of Microsoft Excel and Borland's Quattro Pro for Windows. But improving day-to-day usability remains high on the priority list, and the general trend is toward guiding the user gently through complex procedures—or even performing them automatically.

The Lineup

We tested and analyzed the three leading Windows spreadsheets: Lotus 1-2-3 release 4.01, Microsoft Excel 5.0, and Quattro Pro 5.0. The Excel version we looked at was preproduction software, but enough of the code was final for us to feel comfortable in our analysis.

We also include Lotus Improv for Windows release 2.1, a data modeling tool that can substitute for a traditional spreadsheet in certain tasks. Computer Associates' CA-Compete, another major product that combines a traditional spreadsheet with a multidimensional modeling tool, is being upgraded and was not available for this review.

Multidimensional data modeling has become such a hot topic that we devoted a sidebar to it. In "Multidimensional Data Modeling Comes of Age," we put the four reviewed spreadsheets through a typical data-modeling exercise. Improv is easily your best bet in this category. And in a second sidebar, we take a look at the top DOS spreadsheets (see "DOS Spreadsheets: Not Dead Yet").

Déjà Vu...and Some Key Differences

Spreadsheet manufacturers have no qualms about borrowing successful features from their competitors. Over the years, 1-2-3, Quattro Pro, and Excel have evolved to be strikingly similar in many areas—good news for the user, since it simplifies the transition from one product to another.

For example, they all make it easy to organize your work by allowing a multiple-page worksheet format, also called a 3-D structure, and they all display tabs that let you jump quickly to a desired page in the worksheet notebook. They have customizable icon tool bars (variously called SmartIcon palettes and SpeedBars) that serve as shortcuts for common features. In all these products, right-clicking a selection displays a context-sensitive shortcut menu. And of course they all allow macro recording, offer extensive charting, and let you work with field- and record-based worksheet databases as well as external database tables.

In addition to these common attributes, each product has a set of unique features that may affect your buying decision. 1-2-3 for Windows, for example, offers keystroke compatibility with 1-2-3 for DOS (possibly the most popular program ever), has some unique text formatting options, and is the most versatile when it comes to managing different scenarios. Excel's outliner and table recognition capability are without peer, and the PivotTable feature is nicely integrated. Its clever TipWizard can teach you shortcuts while you work. Quattro Pro for Windows' Object Help and interactive tutors let you learn the basics of spreadsheeting using your own data. And its Workgroup Desktop adds new meaning to the term data sharing by letting you exchange data easily across the LAN or even across an online service. While Improv lacks many of the features found in the big three spreadsheets, its data modeling and global formulas go beyond anything they can manage.

Usability Features

If you're like most spreadsheet users, you spend a lot of time copying and moving cells and ranges. You can use a command for these operations, but direct drag-and-drop manipulation, found in all spreadsheets except Improv, is usually faster: Just select a range and drag it to its new location. To make a copy, simply hold down <Ctrl> while you drag.

When formatting cells, it's often more efficient to select a group of noncontiguous cells to work on. All products except Improv allow this, and Excel and Quattro Pro for Windows even let you name noncontiguous ranges, making it easy to select these cells later or use them in a formula.

In the past, entering or editing data in a cell always occurred on a separate line at the top of the screen and didn't appear in the cell until you pressed <Enter>. Excel and 1-2-3 now support the more convenient in-

Best Buys

In this heated contest, Microsoft Excel 5.0 and Borland's Quattro Pro 5.0 for Windows Standard Edition emerged as Best Buys.

Excel is clearly the most robust spreadsheet product available. It's bursting at the seams with innovative features such as automatic table recognition, data table pivoting, simple and intuitive data filtering, a Visual Basic macro language, and OLE 2.0 support. And when Microsoft finally got around to adding multipage worksheet capabilities, the company did it in a big way: Excel 5.0 allows as many sheets in a workbook as system memory allows.

The best part is that this $495 program remains the most usable spreadsheet for users of all levels, and the new TipWizard makes it easy to learn the shortcuts while you're working.

Quattro Pro for Windows may lack a few of Excel's more sophisticated ease-of-use features, but it doesn't lag far behind. Version 5.0 really pushes the envelope this time, incorporating dozens of new features and usability enhancements, many of them aimed squarely at dethroning Excel. In some areas, notably graphing and presentations, Quattro Pro is arguably the best Windows spreadsheet available. In addition, it may be the easiest package to learn, thanks to a series of interactive tutors that walk you through common procedures using either your own data or sample worksheet data Quattro supplies.

The Standard Edition's low price secured it a Best Buy. You get a tremendous amount of spreadsheet program for $99.95, making Quattro Pro the obvious choice for the price conscious.

cell editing, which allows you to edit a cell's contents inside that cell.

Many spreadsheet users need to access data from other applications or use spreadsheet data in other applications. All of these spreadsheet apps support the Windows Dynamic Data Exchange (DDE) protocol for creating links. Object Linking and Embedding (OLE) lets you take this a step further by inserting an entire object, such as a graphics file or word processing document, from another application. OLE works in the other direction, too: You can insert a spreadsheet object into another application such as a word processor.

Only Excel 5.0 supports the new OLE 2.0 specification, which greatly enhances this type of data sharing; with it you can edit an inserted object from another application without leaving your spreadsheet. When you activate an OLE 2.0 object in an Excel spreadsheet, the menu and tool bar change to those of the originating application. OLE 2.0 also makes inserting such objects easy with a drag-and-drop procedure. Not many applications support OLE 2.0 yet, but you should see dozens of OLE 2.0–enabled software products on the market by the end of the year.

Oodles of Analysis Options

Even though the vast majority of users still find that a handful of built-in functions serve their formula-building needs, spreadsheets have blossomed into veritable analytical powerhouses. These products are chock-full of functions, some generally useful, others esoteric.

Excel and Quattro Pro offer a slew of analytical procedures that were formerly the domain of statistical packages. For those who need sophisticated tools like analysis of variance, correlation, covariance, and other statistical tests, it's nice to be able to access these tools directly in your spreadsheet.

For industrial-strength spreadsheets, you may be interested in a useful feature called *arrays*, found in Excel and Quattro Pro. Much like the analogous feature available in programming languages, arrays let you work with a group of cells as a unit. For example, say you have a price list in the range A1..A20. With Quattro Pro, if you insert the formula @ARRAY (A1..A20*1.05) in cell B1, this formula puts its results in the range B1 through B20,

Multidimensional Data Modeling Comes of Age

Multidimensional data modeling software is quite a mouthful, but it describes a very useful class of programs—those that let you work with data arranged in categories. Examples of such categories or dimensions include products, months, actual versus projected sales, regions, departments, and so on. This type of software has been around for a while, but only recently has it started to show up in spreadsheets. Savvy users have known about DOS products such as Javelin and TM/1 for years, but no product in this genre has gained as much attention as Lotus Improv. Computer Associates' CA-Compete also fits into this category, but the latest version was not available for testing.

So how do traditional spreadsheets stack up when it comes to manipulating multidimensional data? We found out by performing a standard task with the big three spreadsheets and Improv.

REGIONAL.WK4

	A	B	C	D	E
1	Month	Region	Type	Sales	Count
2	Jan	West	New	145	12
3	Jan	East	New	187	15
4	Jan	Central	New	184	16
5	Jan	West	Existing	376	21
6	Jan	East	Existing	409	24
7	Jan	Central	Existing	468	25
8	Feb	West	New	158	16
9	Feb	East	New	189	12
10	Feb	Central	New	193	20
11	Feb	West	Existing	442	15
12	Feb	East	Existing	412	28
13	Feb	Central	Existing	579	31
14	Mar	West	New	145	14
15	Mar	East	New	143	10
16	Mar	Central	New	122	9
17	Mar	West	Existing	378	22
18	Mar	East	Existing	519	25
19	Mar	Central	Existing	568	31
20	Apr	West	New	204	21
21	Apr	East	New	211	20
22	Apr	Central	New	179	9
23	Apr	West	Existing	341	21
24	Apr	East	Existing	310	25
25	Apr	Central	Existing	398	19
26	May	West	New	145	12
27	May	East	New	173	14
28	May	Central	New	164	18
29	May	West	Existing	400	25
30	May	East	Existing	409	24
31	May	Central	Existing	300	16
32	Jun	West	New	145	12
33	Jun	East	New	187	16
34	Jun	Central	New	184	16
35	Jun	West	Existing	376	19
36	Jun	East	Existing	409	21
37	Jun	Central	Existing	175	14

FOR 1-2-3, EXCEL, and Quattro Pro, our task started with entering a 36-record database into a worksheet.

The Task

A company needs to track sales to develop sales reports by month, quarter, region, and type (new or existing clients). We created some sample data, entered it into a worksheet in each of the spreadsheet products, and explored how to manipulate this data and develop a variety of cross-tab tables and reports.

For the three traditional spreadsheets, we started out by creating a database with the following fields: Month, Region (West, Central, East), Type (New or Existing), SalesAmt, and NumSales. See the screenshot at right for an example of how this data was laid out.

1-2-3 for Windows

With our test database, the data manipulation options in 1-2-3 are extremely limited. The Tools • Database • Crosstab command can automatically generate a summary table, but you're limited to two dimensions at a time (see the screenshot at left). For example, you can generate a table that shows the total sales amount by region and month, but if you also want to see sales to new and existing clients in the same table, you're out of luck. The same goes for displaying both the dollar sales and number of sales.

Lotus 1-2-3 Release 4 - [REGIONAL.WK4]

File Edit View Style Tools Range Window Help

B:A1

Crosstab Table For Total Sales by Month and Region

	Central	East	West
Apr	676	621	545
Feb	771	601	600
Jan	672	676	621
Jun	359	696	621
Mar	710	662	623
May	484	682	545

1-2-3'S TOOLS•DATABASE•CROSSTAB command can produce only two-dimensional tables that summarize a single data field.

You can, of course, perform a query on the database to select new sales and then generate a cross-tab table with the query results. You could then perform another query to isolate sales to existing customers and then generate another cross-tab table. This process would give you the information you need, but it would be clumsy; it would require several steps, and the results would appear in two different tables.

The cross-tab tables that 1-2-3 generates are static. That means if you change the data, you need to re-create the table. Another limitation is that you have **continued on page 154**

so you're effectively increasing all the values by 5 percent. In effect, you need to change only one formula in order to change multiple cells.

The three-dimensional nature of these products is ideal for working with groups of files, such as a multidepartment budget; you can place each department's budget on a separate sheet. But often you need to consolidate separate files into a single worksheet. The products all offer helpful tools, but only Excel and Quattro Pro can perform such consolidations by matching up row and column labels. This means that as long as rows and columns have the same name from worksheet to worksheet, they don't need to be arranged in the same order on each sheet.

Habitual what-iffers will appreciate the scenario management tools found in all the spreadsheets except Improv. These tools let you create different versions of cells or ranges, each with its own name, and display a selected version quickly to see the effects on your formulas. For example, your sales forecast worksheet could have several sales projections based on different scenarios that might occur throughout the year.

All the products except Improv include a sophisticated solver—ideal for complex problems with multiple solutions—that helps you find the best answer by running through the possibilities. For example, if you need to ship products from several different warehouses to various locations, you can use this tool to find the plan that minimizes total shipping costs.

Experienced spreadsheet users know that it's all too easy to make a mistake when developing a formula, so built-in auditing tools are there to help you check your work. All the programs here except Improv have these tools.

Presentation Is Everything

If you're sharing the results of your analysis with others, you want it to look good. Fortunately, you have lots of formatting tools at your disposal. These spreadsheets offer nearly all the options you'll ever need for stylistic formatting, including fonts, colors, and alignment options. To format a spreadsheet table quickly, use the automatic table formatting feature found in all but Improv. Oddly, the programs that offer automatic table formatting features come only with preset features; you can't edit them or create your own.

1-2-3 and Excel take top honors when it comes to cell formatting options. Both let

Multidimensional Data Modeling Comes of Age

continued from page 153 no control over the location of the cross-tab table; it's always placed in a new worksheet. Clearly, multidimensional data modeling isn't 1-2-3's strong suit.

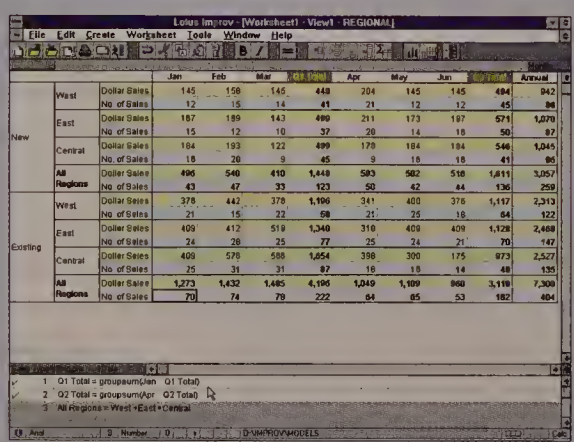
Improv

Importing our 1-2-3 file into Improv proved unhelpful because it can't convert a flat-file database into its multidimensional structure. So we created a new model with four categories. The Months category had six items, the Regions category had three items, the Type category had two items (New and Existing), and the Data category had two items (Dollar Sales and No. of Sales). The entire setup took about 3 minutes.

With the model's structure defined, the next step was to enter the data. In this case we chose to copy the values from our 1-2-3 worksheet and paste them into Improv via the Windows Clipboard. This technique works equally well with any other spreadsheet.

We grouped the Month items into quarters and automatically calculated group totals, a simple task in Improv. Totaling other items was equally easy. For example, we added a new item to the Regions category called All Regions and inserted the global formula All Regions = West + East + Central.

We changed the view by dragging category icons and found that we could produce just about any type of summary report layout in seconds. Furthermore, you can save different views of your data and display them instantly. Updating this model is also easy. Simply add a new month item and enter the new figures.



SETTING UP THE MODEL'S structure was a breeze with Improv, and it's a simple matter to group items and generate group totals.

Improv clearly excelled at this task. We found the program's viewing and grouping options quite flexible and felt more comfortable with this product than with any of the others.

Excel 5.0

After entering the data into a worksheet database, we issued the Data • PivotTable command, which automatically selected the database range we were working on and invoked the four-step PivotTable Wizard. A pivot table is the summary table generated from the original data. The Wizard's dialog box displayed the field names (as buttons) and a representation of a table layout. We simply dragged the field name buttons to their desired positions as rows, columns, pages, or data to be summarized. After responding to a few more options, Excel created a new table that displayed the results. Source data for a pivot table can be a worksheet database, multiple ranges (which are automatically consolidated), an external database, or even another pivot table.

This table is extremely interactive. For example, you can drag a field name to another location and the table redisplays automatically. It's a simple matter to add or delete item totals or subtotals, or to hide specific items—just right-click the field name and select PivotTable Field for a dialog box that lets you set these options.

A handy tool bar gives you quick access to additional features. We selected the rows for the first three months of the year and created a group called QTR-1. Clicking on an icon hides the detail and shows only the quarter summary.

you apply formatting down to the character level—you can make a single character in a label bold, for instance. They also can rotate text in a cell (although Excel is limited to 90-degree rotation) and control vertical alignment in cells.

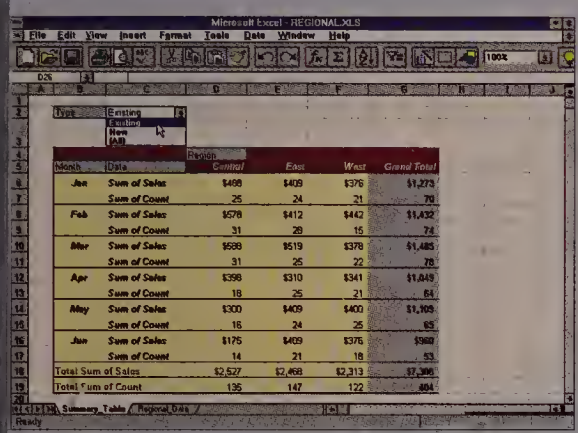
But perhaps the handiest feature is word wrap within a cell, which is ideal for lengthy headings and comparative charts. If you've ever resorted to trial-and-error spacing to try to center a label across a group of columns, you'll appreciate the formatting option that does this automatically (and adjusts automatically if you change the column widths). Improv is the only program of the four that doesn't offer at least some of these formatting tools.

Do you regularly work with multiple worksheets in a 3-D file? Group editing mode will save lots of time. It's a handy feature—format one sheet, and the others follow suit: You don't have to format them separately. All the spreadsheets have formatting tools and group editing mode except Improv.

Perhaps the most significant trend in spreadsheets is in multidimensional data, which lets you view and summarize information in a database table in ways you may never have dreamed possible.

In some cases, you might want to spiff up your worksheet with something extra—a flow diagram, a circle around particularly important cells, or even clip art. A separate draw layer on the worksheet makes these tasks child's play. Both Excel and 1-2-3 offer this feature.

In the early days of spreadsheets, users were happy to be able to generate a simple chart from their numbers. Now sophisticated graphing is becoming the norm and often rivals stand-alone charting software. All these products offer a staggering number of chart types and customization options. Some products even combine analytical options with charting and let you do things like automatically insert a trend line to describe a data series. It's no longer a hassle to insert a chart next



EXCEL'S PIVOTTABLE FEATURE has lots of options and lets you change the display by dragging the gray field names.

Excel's pivot tables are made up of actual values, not formulas. So if you change any of the source data, you must remember to issue the Refresh Data command to update the table.

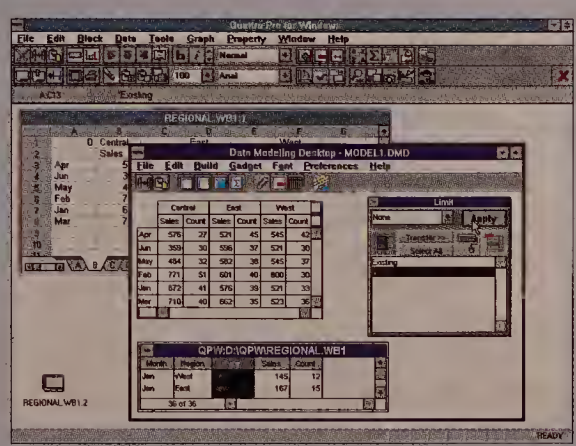
Quattro Pro for Windows

After entering the data in a Quattro Pro worksheet, we selected it and issued the Data Modeling Desktop command, which launched the data modeling application. We specified a hot link via DDE so the results would reflect changes in the data.

Data Modeling Desktop displayed the data in its source window. We chose the fields we wanted to display in a cross-tab table by clicking in the source window, which contains the spreadsheet data, and dragging it to the table. Data Modeling Desktop lets you stack or nest dimensions in its two-dimensional table, so you can effectively see more than two dimensions. Unlike Improv and Excel, however, it doesn't let you display slices of the data as pages. But you can filter the data by using a pop-up window to specify values of a single dimension. For example, we were able to limit the display to either new sales or existing sales.

Data Modeling Desktop lets you create groups of items with automatic subtotals. Doing so is tedious, however, since you must hold down <Shift> as you click on each item name in the group. And if you ungroup the items to display the detail, you must manually regroup them again to hide it. Unfortunately, you can't write a macro to automate these procedures.

When we were satisfied with the table, we selected the data and issued the command to copy it to Quattro Pro, again specifying a DDE link. The original worksheet data was linked to Data Modeling Desktop, and the results from this application were linked back to another range in the worksheet. Because of this two-way link, the table can automatically reflect changes in the data. However, the use of an external application to perform this modeling makes things more complicated than necessary. Excel's integrated approach is far preferable.



QUATTRO PRO'S DATA MODELING desktop is a separate application linked to the spreadsheet using Dynamic Data Exchange (DDE).

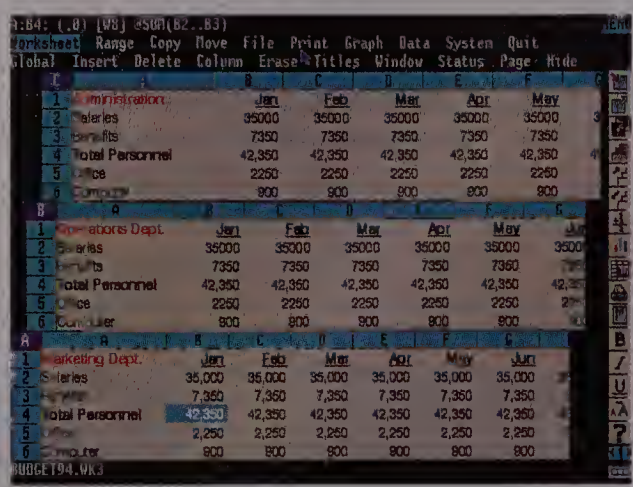
Improv: A Model Data Modeler

Improv was the easiest and most flexible package to work with—not surprising since it was designed for this type of task. We found that 1-2-3 is not equipped to do this sort of data manipulation. Quattro Pro and Excel accomplished the tasks, but your initial data structure is critically important in determining how much you can manipulate it using Quattro Pro's Data Modeling Desktop or Excel's PivotTable. In fact, you can't use an existing table in most cases. Quattro Pro did not provide an adequate level of flexibility, and relying on a separate application is clumsy. Excel's surprisingly flexible PivotTable features offered many of the same advantages as Improv. Of the traditional spreadsheets, Excel performed the best. With both Excel and Quattro Pro, however, it's likely you'll need to restructure existing information before you can get any real value out of their data modeling tools. Improv is the obvious choice for heavy-duty tasks such as complex financial analysis, but for most common data modeling needs, Excel is just what the doctor ordered.

DOS Spreadsheets: Not Dead Yet

As with every other software category, all the real spreadsheet innovations are happening in Windows. But if your system can't run Windows—or if you simply prefer the snappy and responsive feel of text mode—don't despair. Several manufacturers continue to supply DOS-based spreadsheets; the best of them come from Lotus and Borland.

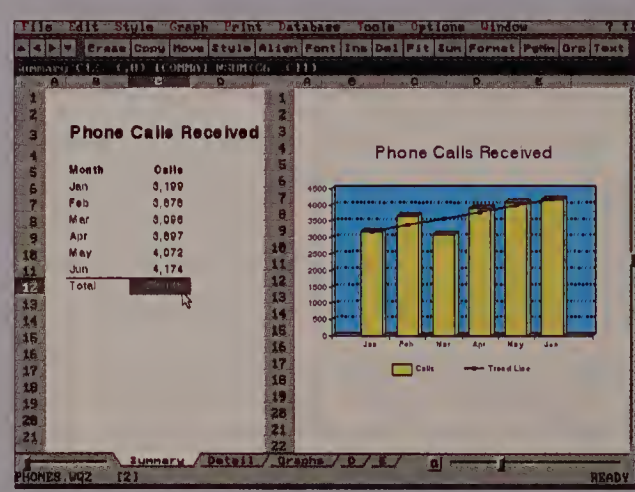
1-2-3 release 2.4 is best described as a basic spreadsheet. It has changed relatively little over the past seven or eight years, apart from the Wysiwyg add-in that has given the product a face-lift. This graphical add-in forces you to work with two independent menu systems. When you save your work, the formatting information is stored in a separate file, so if you distribute the worksheet, you have to remember to include both files. Also, 1-2-3 release 2.4 lets you work with only one file at a time, and files are of the basic flat-file variety—no 3-D worksheets here. Graphing features are primitive compared with those of Windows-based spreadsheets, and the menu systems are the older moving bar variety, not the more modern pull-down type. There are many third-party 1-2-3 add-ins that bring new functionality, but every add-in reduces precious available memory.



1-2-3 RELEASE 3.4, shown here with the Wysiwyg add-in attached, supports some Windows-like features, such as multipage worksheets and multiple documents.

1-2-3 release 3.4 is the better choice if you want a Lotus DOS spreadsheet. This version also ships with the Wysiwyg add-in, which has the same schizophrenic menu problems as in release 2.4. However, release 3.4 lets you work with multiple files, and the files are true 3-D worksheets. It can also use extended memory, so if your system is equipped with extra RAM, you're less likely to encounter out-of-memory problems. Release 2.4 of 1-2-3 for DOS lists for $495; release 3.4 lists for $100 more.

Borland's new Quattro Pro for DOS 5.0 is clearly your best bet in terms of features, ease of use, and sheer value. (At $99, it's a steal.) Despite the same price and version number, this is not a DOS version of Quattro Pro for Windows—the Windows version has superior usability and features. Still, it's the best of the DOS spreadsheets available.



QUATTRO PRO FOR DOS BEATS 1-2-3 in features and ease of use. Like its Windows relative, it also comes with an outstanding price.

Like the Windows version, Quattro Pro for DOS uses a notebook orientation for its 3-D worksheets. Unlike 1-2-3 for DOS, it lets you display your worksheets in movable and sizable windows. Another advantage is that you can access all the fancy formatting features, even if you're running in plain-text mode. You won't be able to see the effects on screen, but this is still far superior to the approach used by both DOS versions of 1-2-3.

If you're in the market for a first-class DOS spreadsheet, we suggest you put Quattro Pro for DOS at the top of your list.

to your numbers, although Improv limits this to a special presentation view outside the spreadsheet. If you need to make changes to a chart, it's much easier to do the editing in the context of the chart's location, rather than in a separate chart window. Both Excel and 1-2-3 allow you to modify a chart directly on a worksheet.

When it's time to put your work on paper, you won't be disappointed. All products offer the standard grab bag of header and footer options, page numbering, print preview, and even automatic compression so your work fits on one page.

If you choose to present your work on screen, you'll be interested in a slide-show feature. Both Excel and Quattro Pro offer this (Quattro Pro makes it easier to set up), and both packages let you use a variety of transition effects.

Data Access and Manipulation

One of the most common spreadsheet activities is working with databases and lists. Spreadsheets have always had the capability to handle record- and field-oriented data, and now all the major products can work directly with tables stored on disk in common database formats.

To isolate records of interest (a process known as *querying*), Quattro Pro still uses the cumbersome method found in the original 1-2-3 for DOS version, but 1-2-3 for Windows and Excel make database querying easier than ever. With Excel, for example, you can isolate the data you need simply by choosing from pull-down lists in the field headers.

A common method of summarizing data in a database is to generate a cross-tab table. For example, if you have a database that consists of monthly sales data, you could generate a two-way cross-tab table showing product names down the left side and regions across the top. The intersection of each row and column displays the total sales for the product for a given region.

Databases can contain a lot of information, and you often need to work with data in more than two dimensions. For example, you might want to extend the analysis to include months. That's when multidimensional database features come to the rescue.

All these products can work in conjunction with external databases, all support multitable relational queries (dynamic links that update your **continued on page 161**

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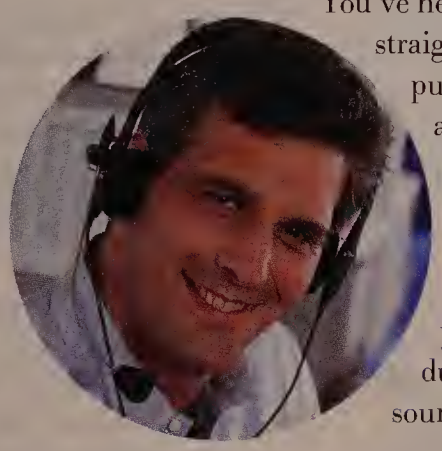

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spreadsheet if the information in the database changes), and all have the capability to access SQL databases.

Customization: Macros and Beyond

Spreadsheet macros, which let you automate a series of operations, date back to the original release of 1-2-3 for DOS. This simple keystroke recording has evolved significantly, and macro programming languages are quite sophisticated in all these products—yet all but Improv still allow you to record your actions so you can repeat them later. Excel and Improv even include BASIC-like macro languages.

There are other ways to customize your spreadsheet applications. For example, you can add new commands to the menus or create custom menus from scratch. In addition, all these products allow advanced users to create custom dialog boxes that make their applications even easier to use and more professional-looking.

Spreadsheet Performance

We tested 1-2-3, Excel, and Quattro Pro on opening, printing, and copying and pasting in 1.3MB and 228K spreadsheet files. We also performed recalculation tests on a 2.3MB file rich in complex formulas. (Since our tests were designed for traditional spreadsheets, we couldn't get comparable results for Improv and didn't include it in testing.) What did we find? Performance is no longer an issue with the major spreadsheets—they are all very fast.

When a Regular Spreadsheet Just Won't Do

The spreadsheets reviewed in this article offer an incredible range of capabilities, but they can't do it all. If your analytical needs deviate from the mainstream, you have several spreadsheet alternatives. Need a program for presenting and summarizing existing data? Corporate Vision 1.0 (IntelligenceWare; 800/888-2996, 310/216-6177) combines elements of databases, spreadsheets, charts, and multidimensional analysis, making this $690 program ideal for corporate executive information system (EIS) tasks. It also has customization tools that let you set up turnkey applications, complete with fancy backgrounds, dialog boxes, and custom menus.

If you tend to describe a process by scribbling flow diagrams on cocktail napkins, consider DS Lab 2.0 ($195 from DS Group, 800/828-8760). This "visual spreadsheet" lets you construct a model by using graphic symbols to represent inputs, variables, constants, series, and tables; you define the relationships between these elements by connecting them with arrows. You can also opt to display the output in a table.

FuziCalc 1.11 ($495 from FuziWare, 800/472-6183) lets you deal with uncertainty within the context of a spreadsheet. When you enter a soft value into a FuziCalc cell—for example, an income forecast—you can specify your level of confidence about the value, shown as a "belief graph," instead of using a best guess as you would in a standard spreadsheet. When fuzzy numbers are used in formulas, the result of the formula is also a fuzzy number.

Lighten's Advance 2.0 resembles Improv in the way it makes dealing with multidimensional data easy. You can view a set of data in different ways, give each view its own name, and use English-language formulas. Like Improv, Advance keeps formulas and data separate. You can define a variable and enter a single formula that applies to all items in the sets. This $495 program is available from Lighten (800/398-4545).

Choose Your Corporate Weapon

Competition was fierce, but Excel 5.0 and the Standard Edition of Quattro Pro 5.0 for Windows emerged the victors. Most users will find that, with the possible exception of Improv, all the products here can easily handle common office chores such as charting and creating financial models. Nonetheless, Excel is your top choice for features and ease of use, while the budget-minded should look straight to Quattro Pro.

John Walkenbach is a frequent contributor to PC World *and author of eight spreadsheet books. He can be reached on PC World Online (see page 12 for contact information).*

For more information about all products in this article, circle reader service no. 909.

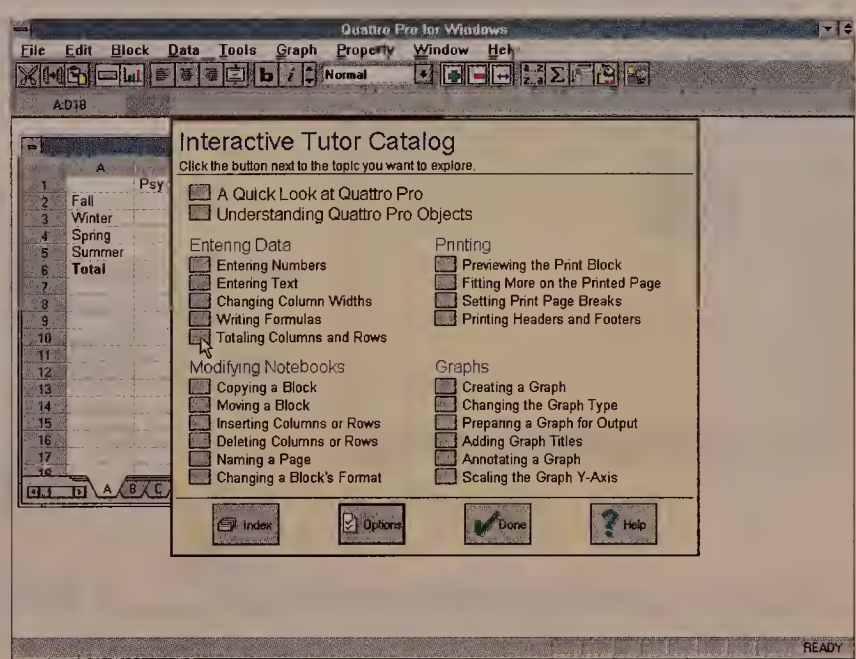
Borland Quattro Pro 5.0 for Windows Standard Edition, Workgroup Edition

PROS: Interactive tutors, data modeling, analysis tools, integrated work-group features

CONS: Inconsistencies in user interface, potentially confusing menus

The latest upgrade of Quattro Pro is a winner, with a bevy of built-in tools as well as a new scenario manager, multidimensional data modeling, and analysis tools that equal or exceed Excel 5.0's. The basic version, without the work-group features, is an amazing value at $99.95—one-fifth the price of the competition—and earns this product a Best Buy. The Workgroup Edition, however, matches the competition at $495.

Of all these products, Quattro Pro for Windows may be the easiest to learn, thanks to a series of interactive tutors that guide you through common procedures using your worksheet data or sample data provided by the program. For example, simply call up the Creating a Graph tutorial and get step-by-step instructions. At any time you can hold down <Ctrl> and right-click on virtually any part of the screen (including SpeedBar icons) to get a pop-up, context-sensitive help message. One more click and



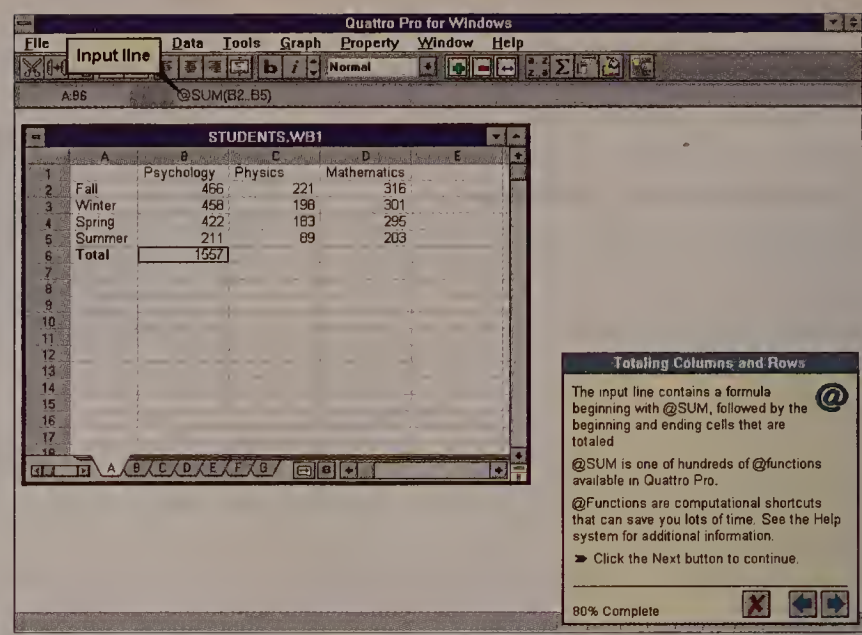
QUATTRO PRO FOR WINDOWS' INTERACTIVE TUTOR offers a variety of lessons to help you learn the fundamentals.

you'll be reading a help screen on that topic. In the original version of Quattro Pro for Windows, right-clicking a selection results in a handy property inspector dialog box that lets you adjust any of the selection's properties. Now right-clicking brings up a shortcut menu with appropriate commands, but the inspector is always the first choice.

In the past, if you needed to perform complex numerical analysis, Excel was pretty much your only choice. Excel users may have a sense of déjà vu when they start investigating some of the analytical features in Quattro Pro, which are virtually dead-ringers for Excel's Analysis ToolPak options. But Borland added lots of help in the form of Experts (similar in concept to Excel's Wizards), as well as a few new analysis options. One of the more interesting is the loan amortization selection. Provide a few key variables, and Quattro Pro spits out an entire worksheet complete with formulas and formatting. The latest upgrade also includes array formulas (like those in Excel) and (unlike any other spreadsheet) lets you compile formulas for faster recalculation. The latter is especially useful for large and formula-laden spreadsheets.

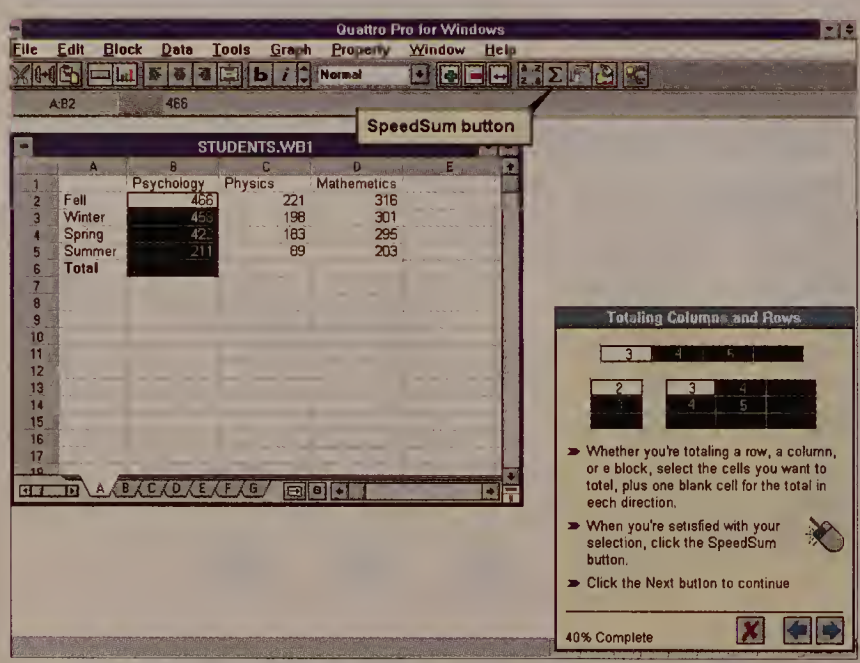
When it comes to richness of built-in functions, Quattro Pro outdoes Excel. With a total of 373 @functions, it's a good bet you'll find several to simplify formula building. For example, the new @CONVERT function converts more than 60 units of measurement in categories such as time, distance, liquid, and other systems more useful to the scientific community.

The new Scenario Manager is powerful, and many will prefer it to 1-2-3's Version Manager since it's more flexible. For example, you don't need to explicitly designate ranges you want to include in a version; you can use the entire sheet or even all sheets in the file. It also automatically highlights the cells that change when you display a new version. If you don't want to take the time to learn this feature, you can call on one of the built-in Experts to walk you through the steps to define your scenarios.



THE INTERACTIVE TUTOR provides additional information and leads you to other relevant lessons.

Three commands in Quattro Pro actually launch separate applications that work in conjunction with your worksheet. The Database Desktop, for instance, lets you work with external databases and paste or DDE-link the results of queries into a worksheet range. The Data Modeling Desktop can manipulate and summarize database information. Finally, the Workgroup Desktop lets you share data with other members of work groups through a variety of messaging services (this feature is available only in the Workgroup Edition). Although these external applications work well, you'll find a few differences in the user interface. For example, right-clicking doesn't bring up a context-sensitive menu, you forgo object help, and there is no undo command.



YOU CAN USE YOUR OWN WORKSHEET or a sample worksheet. The tutor displays directions, and you carry them out. Note the arrow pointing out the SpeedSum button.

Quattro Pro 5.0's charting is the best of the bunch. Especially interesting is the program's capability to determine the chart type most appropriate for your data. The charts are easy to work with as well—a few mouse clicks is all it takes to perform various analyses; you don't need to fiddle with formulas. Chart analysis options include moving averages, aggregation, and linear and exponential trend lines. The only thing we missed was a draw layer. It's easy to insert a chart onto a worksheet, but all chart editing and drawing has to take place in a separate window.

Developing user-oriented applications with Quattro Pro is a snap. Its unique UI (user interface) Builder command lets you create attractive dialog boxes and link the controls to worksheet cells. You can often get by without using macros. Customizing the icon tool bars, or SpeedBars, is easier than ever; as in the other products, it's basically a drag-and-drop operation. SpeedBars can't be relocated, however; they always appear at the top of the screen.

Any downsides? For one, Quattro Pro falls short in worksheet auditing. Excel and 1-2-3 offer a variety of useful auditing tools, but Quattro Pro has just a few commands, which aren't all that useful. Perhaps an even bigger drawback is the complicated menu structure. Placement of some menu options seems rather arbitrary and makes things a bit overwhelming at times, especially since Quattro Pro is packed to the rafters with features. For example, rather than using traditional dialog boxes, several commands merely add another SpeedBar to the top of the screen. Select the Tools•Spell Check command, and all it does is slap a double-height tool bar below the others. In fact, it's possible to stack an unlimited number of tool bars at the top of your screen—each of which is fixed in place until you click a button to remove it. Besides cluttering up valuable screen real estate, they make the program look more complicated than it is.

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Despite its few weaknesses and the lack of work-group features and a spelling checker, Quattro Pro is a powerful program with lots to offer users of all levels. Performance results were solid, with better-than-average times for file open and recalculation. What garnered it a Best Buy? The Standard Edition of Quattro Pro lists for only one-fifth the price of its competitors and costs as little as $80 on the street.

List price: $99.95 (Standard Edition), $495 (Workgroup Edition); *Borland Int'l, 800/331-0877, 408/431-1000.*

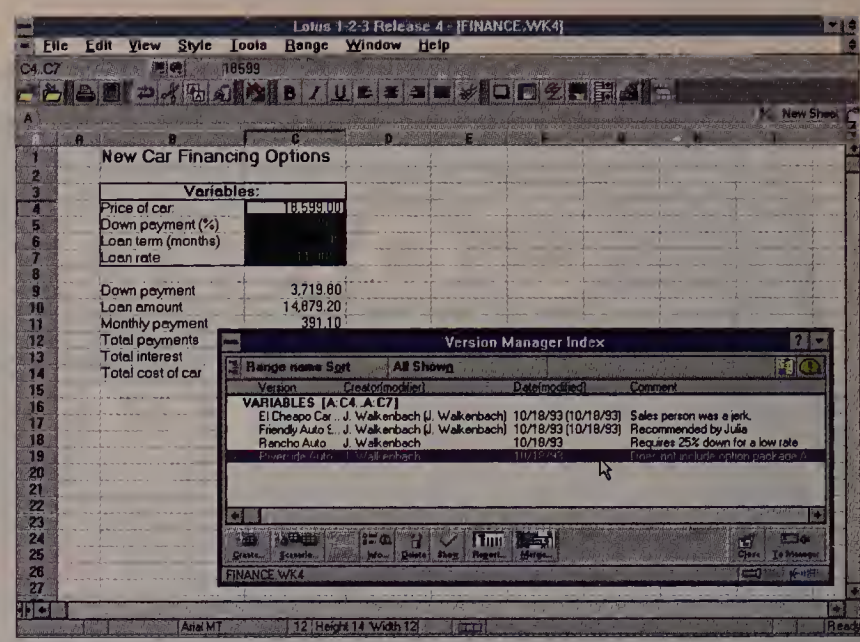
Reader service no. 831

Lotus 1-2-3 release 4.01 for Windows

PROS: Version Manager, database queries, in-place cell and chart editing, around-the-clock support
CONS: Limited import and export options, one window per file, weak analysis tools

If you previously dismissed Lotus 1-2-3 for Windows based on the less-than-stellar reviews of release 1.1, it's time to take another look. 1-2-3 for Windows has come a long way. You'll find improvements in virtually every area—most notably its user interface, formatting, charting, and database querying. The new Version Manager is just the ticket for those who need to keep track of different scenarios. In a feature-by-feature comparison, 1-2-3 release 4.01 for Windows may not have as many check marks as its competitors, but most users will find that this product serves their needs well, especially for typical office applications.

The first thing we noticed was the improved ease of use. Release 4.01's completely revamped user interface makes this product a joy to use. The right mouse button brings up a shortcut menu relevant to the current selection. As in Ami Pro, you can view and change cell properties using the status bar at the bottom of the screen. The SmartIcon palette changes automatically based on what you're doing. Although you can see only one palette at a time, it's a snap to switch palettes. 1-2-3, of course, features drag-and-drop for copy and move operations (though it doesn't warn you if you're about to overwrite existing information). This version also features in-cell editing—a more intuitive approach than having to jump to an edit line above the document. The program even supplies a close parenthesis in a formula if you forget it.



THE VERSION MANAGER INDEX DISPLAYS information about all the versions defined. You can also combine specific versions of ranges into named scenarios.

If you use your spreadsheet to store database tables or as a front end for external databases, you'll be delighted with the improvements in release 4.01. You can forget all the tedious details you ever learned about criterion and output ranges, since database querying is now done with a clever dialog box. The results of a query are stored in a special range, and when you activate this range, the Query menu appears. This lets you easily modify the query, refresh it, or perform automatic aggregation—to get total sales by region, for instance. The latest revision of 1-2-3 still uses DataLens drivers to connect to external databases and ships with drivers for dBASE, Paradox for DOS and Windows, SQL, and DB2/2.

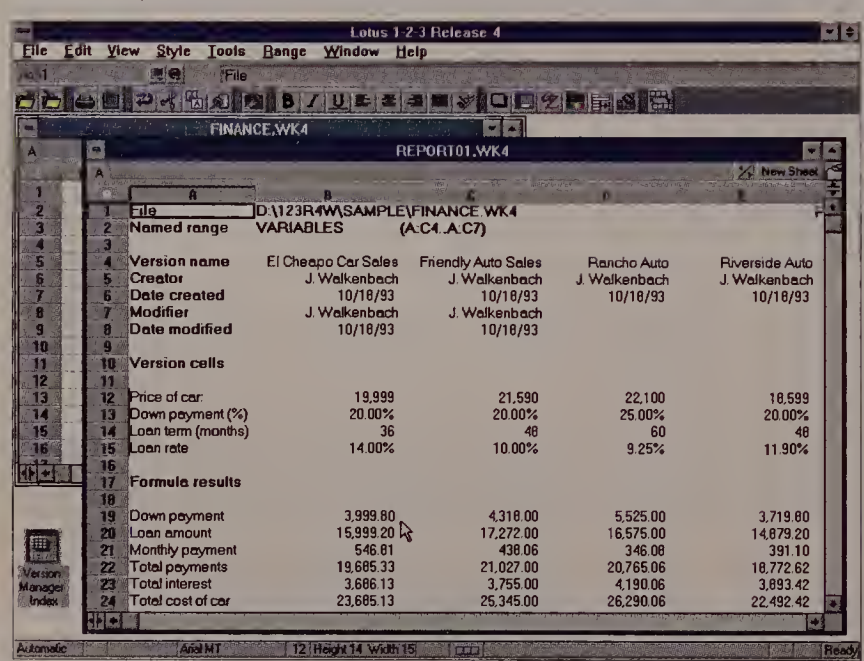
1-2-3 for Windows has a data cross-tab command, but it's no match for Excel's more powerful and flexible PivotTable feature. For example, 1-2-3's cross-tabs are limited to a simple table showing only two fields and a single aggregate field. And if you want to perform Improv-like manipulations of data, you'll need to use Improv.

The new Version Manager is the star of the show. It lets you store and manage different versions of selected worksheet ranges. These different versions can then be combined into named scenarios—for example, Best Case, Worst Case, Most Likely Case. You can even request a report that summarizes the effects of your scenarios on key bottom-line cells.

Version Manager is ideal for work-group situations in which co-workers enter forecasts or assumptions as separate versions of an input range. For example, your finance department may have three different sets of interest rate forecasts, and your sales department may have two sales forecasts—one based on the current product line and another on an expanded product line.

You can use Lotus Notes or a network to share your file with others. Alternatively, you can send out a copy of your file and then merge versions and scenarios into a master file. If getting input from co-workers and juggling various scenarios sounds familiar, Version Manager alone may be enough reason for you to choose 1-2-3 for Windows.

1-2-3 for Windows offers a few unique formatting features. **continued on page 166**



VERSION MANAGER CAN ALSO PRODUCE A REPORT that summarizes the effects of each version on selected cells in your worksheet.

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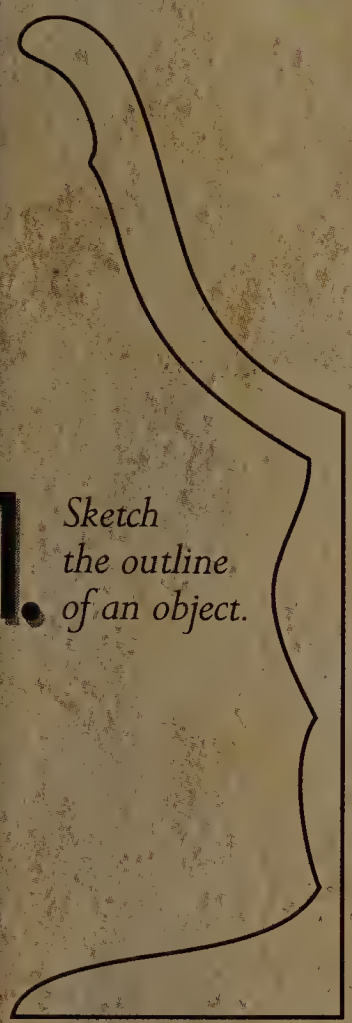
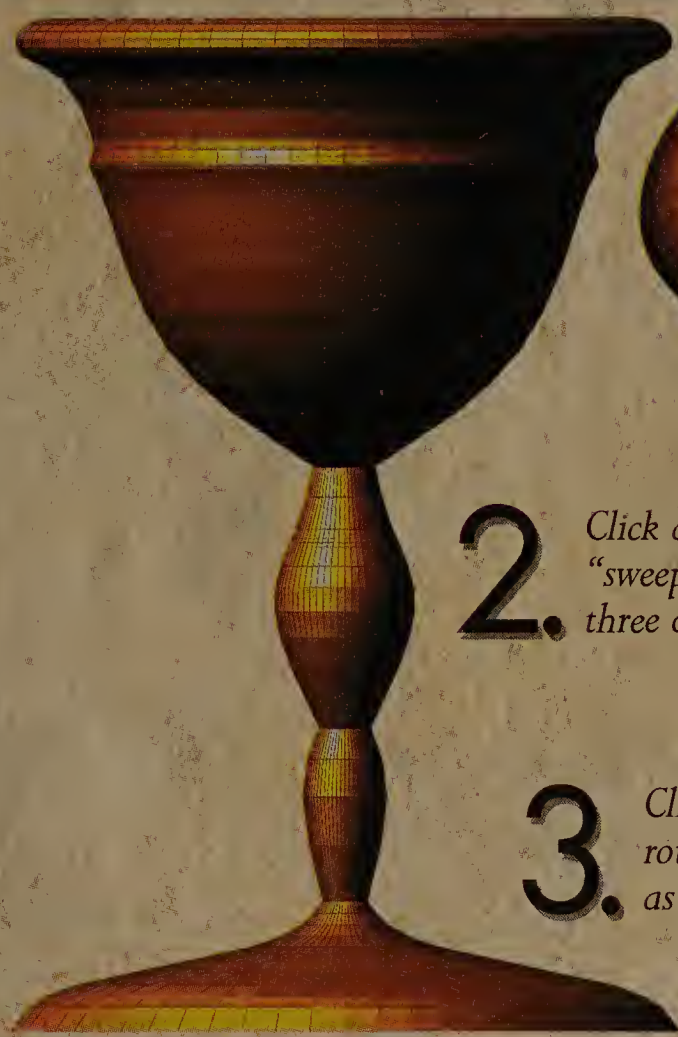
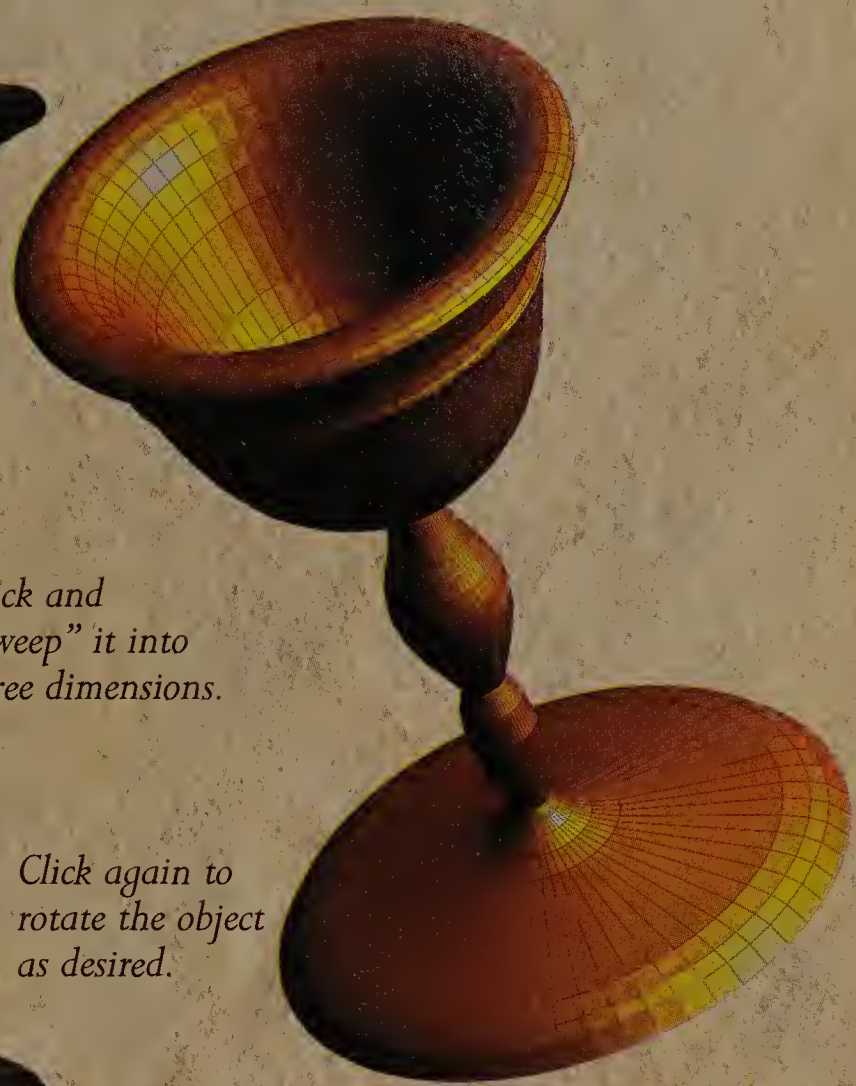


1. *Sketch the outline of an object.*



2. *Click and "sweep" it into three dimensions.*

3. *Click again to rotate the object as desired.*



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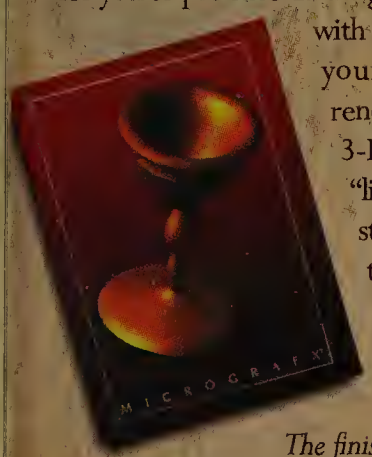

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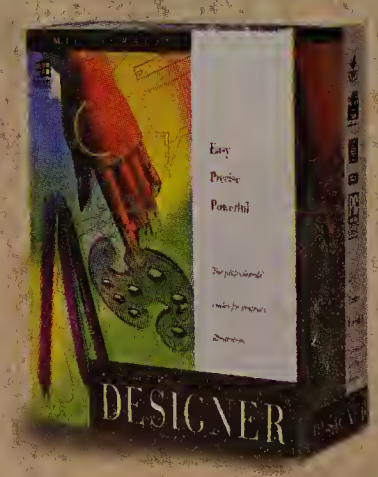

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While Excel lets you display text vertically in a cell, only 1-2-3 for Windows lets you set the precise angle at which you want your text to appear. (Quattro Pro and Improv do not allow you to adjust the text angle at all.) The program also includes a dozen designer frames that can spiff up an otherwise dull range of numbers or frame an embedded chart handsomely.

As in Excel, every 1-2-3 worksheet has a draw layer on which you can add arrows, diagrams, free-floating text, and graphics. When you create a chart, it goes directly on the worksheet's draw layer rather than in a separate window. Not having to deal with separate chart windows makes 1-2-3 charting easier than ever. Modifying the chart is straightforward: Simply double-click or right-click the chart element and go for it—and you can drag and resize most chart elements directly. 1-2-3 offers all the basic chart types, but it fails to match the other spreadsheets when it comes to variety.

1-2-3 for Windows is a great upgrade, but all is not perfect in Lotusland. Although it can now read (but not write) Excel 4.0 files, 1-2-3 for Windows is still weak in file import and export options. For example, to load a DBF file as a worksheet, you have to resort to using a stand-alone DOS translation utility. Particularly annoying is the inability to open an additional window to view another section of a worksheet file. If you want to display the same file in three windows so you can see three different areas or pages of the file at once, you're out of luck. This, coupled with the fact that you can split a window into only two panes, means that viewing options are quite limited. Another problem is with group editing mode. Although this mode makes it easy to format multiple sheets in a file quickly, you cannot specify which sheets in a group you want to edit. Consequently, this feature is usable only when you need every sheet in your file formatted identically.

Even with these drawbacks, 1-2-3 4.01 for Windows will satisfy all but the most demanding spreadsheet users, and it's easy to learn and use. Its performance test results were respectable, falling in the middle of the pack. If you don't require the absolute maximum in features, be sure to give this program a look.

List price: $495; *Lotus Development Corp., 800/872-3387, 617/577-8500.*

Reader service no. 832

Lotus Improv for Windows release 2.1

PROS: Works with up to 12 data dimensions, global formulas, flexible data grouping and viewing

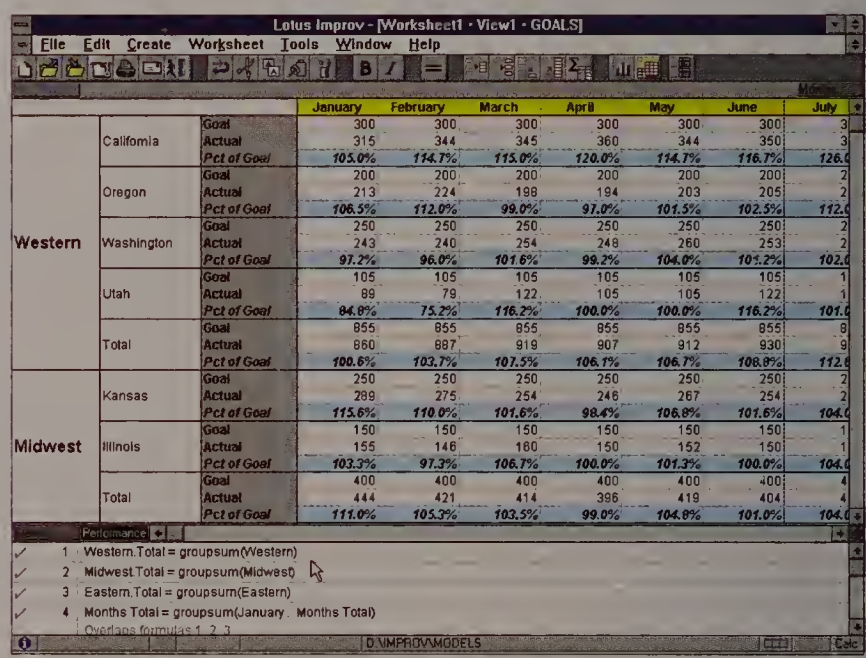
CONS: No password protection, lacks many common spreadsheet features

If you're looking for a good all-purpose spreadsheet, Improv is not the answer. Improv is advertised as a spreadsheet, and it may look and feel like the other products in this comparison, but it is best described as a multidimensional data modeling tool. It's not for everyone, but what it does, it does very well.

Improv's forte is dealing with highly structured multidimensional data. Any of the other spreadsheets can handle a multidepartment budget model easily—budget items are in the first column, months are in the first row, and each department is on a separate sheet—in three dimensions. But what if you want to add a fourth dimension to track actual expenditures and variance? This is where a standard spreadsheet becomes unwieldy, and Improv shows its true grit. An Improv model can have as many as 12 dimensions, making it the ideal tool for very sophisticated tracking and modeling. On the other hand, when asked to perform a simple operation such as adding two cells together, even spreadsheet wizards will probably scratch their heads during their first encounter with this program. Improv takes such a radically different approach that the skills you have acquired with other spreadsheets won't do you much good.

Like a database, Improv stores its data centrally. This means that a specific data point is not physically tied to a particular cell in its display. Consequently, it's a simple matter to change dramatically the way your data is displayed. You can display up to 12 categories (also called *data dimensions*) as rows, columns, or pages. Dragging a category name instantly changes the way you view your data—changing a row-oriented category to display in columns, for instance. In addition, it's easy to group items together and insert group totals automatically. This lets you collapse or expand the data to see more or less detail. Both Excel and Quattro Pro for Windows attempt to add some of Improv's functionality to a traditional spreadsheet (see "Multidimensional Data Modeling Comes of Age" for details).

Unlike most spreadsheets, which store formulas in cells, Improv's formulas are global, which means that a single formula can produce results in dozens or hundreds of cells. This eliminates the common spreadsheet routine of building a formula and then copying it to adjacent cells. You enter your global formulas into a special formula pane, and the formulas are evaluated in order. Improv's formulas refer to category and item names rather than obscure cell references, making them somewhat self-explanatory. Therefore, an Improv formula might read something like Discount = List * DiscountPct.



			January	February	March	April	May	June	July
Western	California	Goal	300	300	300	300	300	300	3
		Actual	315	344	345	360	344	350	3
		Pct of Goal	105.0%	114.7%	115.0%	120.0%	114.7%	116.7%	126.
	Oregon	Goal	200	200	200	200	200	200	2
		Actual	213	224	198	194	203	205	2
		Pct of Goal	106.5%	112.0%	99.0%	97.0%	101.5%	102.5%	112.
	Washington	Goal	250	250	250	250	250	250	2
		Actual	243	240	254	248	260	253	2
		Pct of Goal	97.2%	96.0%	101.6%	99.2%	104.0%	101.2%	102.
	Utah	Goal	105	105	105	105	105	105	1
		Actual	89	79	122	105	105	122	1
		Pct of Goal	84.8%	75.2%	116.2%	100.0%	100.0%	116.2%	101.
	Total	Goal	855	855	855	855	855	855	8
		Actual	860	887	919	907	912	930	9
		Pct of Goal	100.6%	103.7%	107.5%	106.1%	106.7%	108.8%	112.
Midwest	Kansas	Goal	250	250	250	250	250	250	2
		Actual	289	275	254	246	267	254	2
		Pct of Goal	115.6%	110.0%	101.6%	98.4%	106.8%	101.6%	104.
	Illinois	Goal	150	150	150	150	150	150	1
		Actual	155	146	160	150	152	150	1
		Pct of Goal	103.3%	97.3%	106.7%	100.0%	101.3%	100.0%	104.
	Total	Goal	400	400	400	400	400	400	4
		Actual	444	421	414	396	419	404	4
		Pct of Goal	111.0%	105.3%	103.5%	99.0%	104.8%	101.0%	104.

THIS IMPROV MODEL HAS THREE CATEGORIES. States and Performance are shown as rows, Months as columns. The bottom of the screen shows the formula pane.

But using these general formulas also means that a single data point could be affected by more than one formula. Perhaps the most confusing aspect of Improv is dealing with these overlapping formulas. They're always flagged, but it's up to you to determine which formula has precedence.

Improv shows its different approach in other areas besides formulas. Its charting

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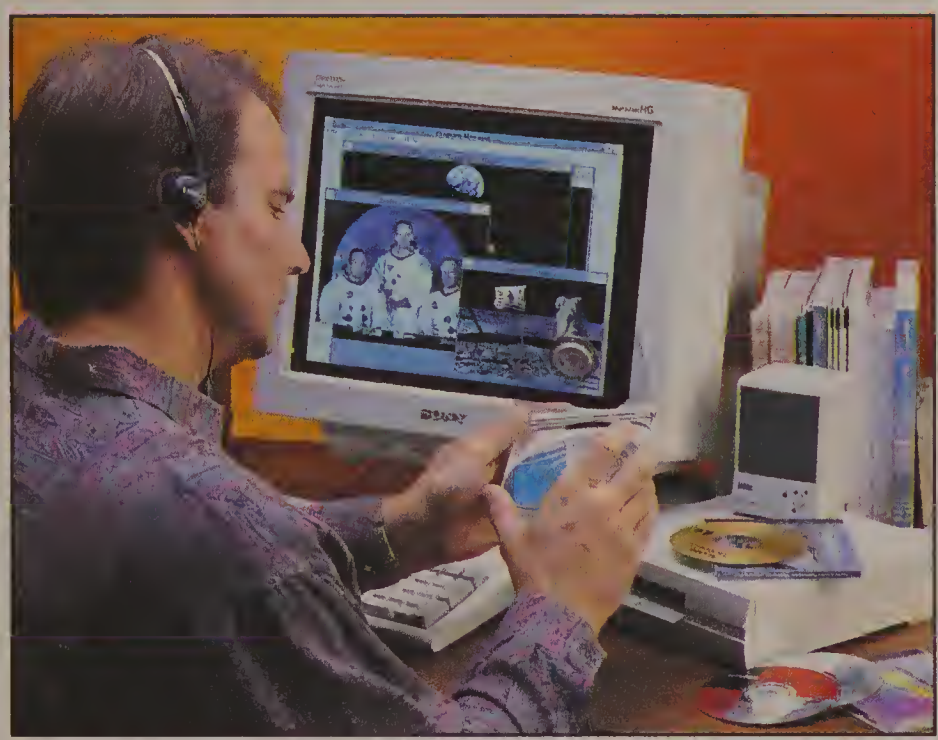

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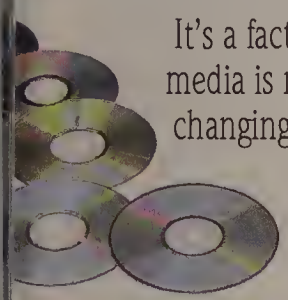

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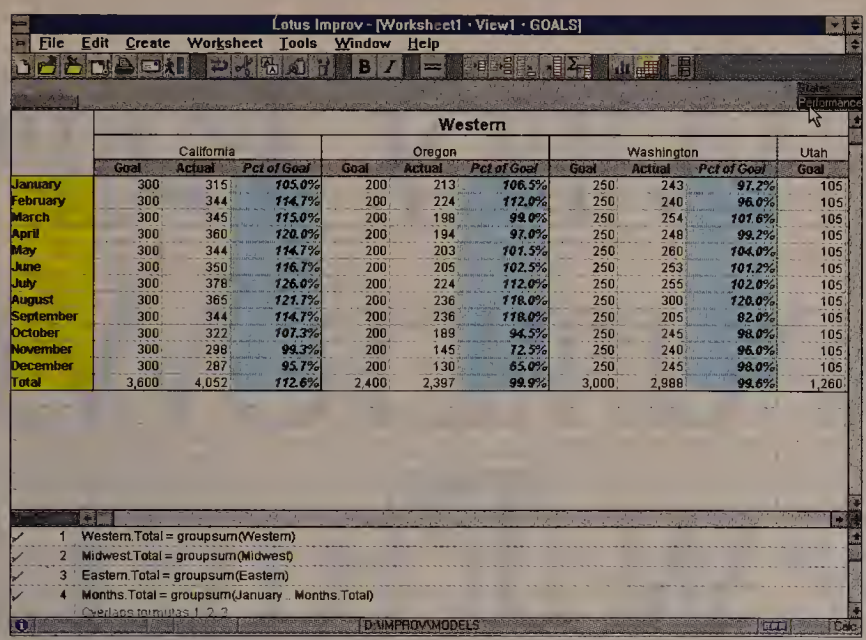

DRAGGING THE CATEGORY NAMES changes the view instantly. Here States and Performance are displayed as columns, Months as rows.

feature is similar to 1-2-3 for Windows', but it handles some aspects quite differently. For example, you can't simply insert a chart into your worksheet; you need to create a special presentation window. It also differs in its approach to macros. Improv has a BASIC-like scripting language that can automate some tasks, but casual users are left out of the picture, since the program does not have a macro recorder.

The latest Improv upgrade includes a version of Q+E Extend so you can access several types of database files. The upgrade also supports 1-2-3 release 4.0's WK4 files and Notes/fx, which enables linking between Improv cells and fields in Lotus Notes and lets Improv work well as a companion to 1-2-3.

Lotus provides several template files that will give you a head start setting up your models. Once you learn the basic concepts, you'll find most aspects of this product remarkably easy to use. The user interface is exemplary, incorporating lots of ease-of-use features, right-click shortcut menus, SmartIcons, a live status bar, and a unique settings box that offers one-stop shopping for formatting—you can display this at all times if you like. When you select a formula, the cells that it uses are highlighted, making it easy to check if a formula is actually doing what you want it to.

But dig a little deeper and you'll find that Improv lacks many of the key features you may take for granted in other spreadsheets. For example, there's no search command and no way to annotate a formula or cell. Improv also lacks scenario management, a nonlinear solver, and even simple goal seeking. Improv doesn't provide a way to password-protect a file—an odd omission, since many users will develop models dealing with sensitive financial information.

Although it won't substitute for a standard

PC WORLD TEST CENTER REPORT

Windows Spreadsheets: All Hot Performers

	Borland Quattro Pro 5.0 for Windows*	Lotus 1-2-3 release 4.01 for Windows	Microsoft Excel 5.0*
Statistical spreadsheet test	STATIC.WB1 (1,617,431 bytes)	STATIC.WK4 (1,144,780 bytes)	STATIC.XLS (1,345,409 bytes)
Open	10	13	32
Print	344	285	127
Copy and paste	84	50	20
Financial spreadsheet test	FINAN.WB1 (294,789 bytes)	FINAN.WK4 (246,324 bytes)	FINAN.XLS (227,907 bytes)
Open	3	5	8
Print	100	112	55
Copy and paste	4	6	7
Recalculation test	RECALC.WB1 (1,788,005 bytes)	RECALC.WK4 (2,477,840 bytes)	RECALC.XLS (2,336,353 bytes)
Recalculation	88	147	50

*Best Buy

Test results are in seconds. Improv not tested because it couldn't produce comparable results.

Methodology Tests were run on a 486DX-33 with 8MB of RAM. We used MS-DOS 5.0 and Windows 3.1, both with default installations. We configured Windows with an HP LaserJet III as the default printer, disabled Print Manager, and attached a null printer to LPT1. We set the video resolution to 800 by 600 with 256 colors. We used the default installation for each spreadsheet. After each test, we exited the application. Each test was repeated four times for each file, and the results were averaged.

We used three spreadsheets for testing: a statistical spreadsheet (STATIC), a financial spreadsheet (FINAN), and a business spreadsheet (RECALC). The financial and statistical spreadsheets were originally 1-2-3 for DOS spreadsheets. We imported them into the different application formats and saved them for testing. The business spreadsheet, RECALC.XLS, was originally an Excel worksheet and was imported and saved in the different application formats. We used the financial and statistical spreadsheets for all tests except recalculation.

Open Timing began when we clicked OK in the Open dialog box and ended when we regained control of the keyboard.

Print Timing began when we clicked OK in the Open dialog box and ended when we regained control of the keyboard.

Copy and paste Portions of each spreadsheet were copied and pasted. Timing began when Paste was selected from the menu and ended when we regained control of the keyboard.

Recalculation We used the business spreadsheet for this test. We changed one cell that affected the entire spreadsheet. Timing began when we pressed <Enter> and ended when we regained control of the keyboard.

Testing performed by Ulrike Diehlmann. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

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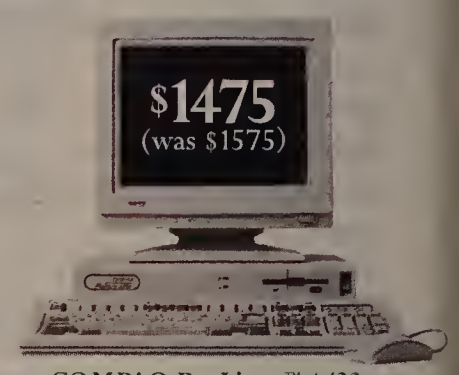

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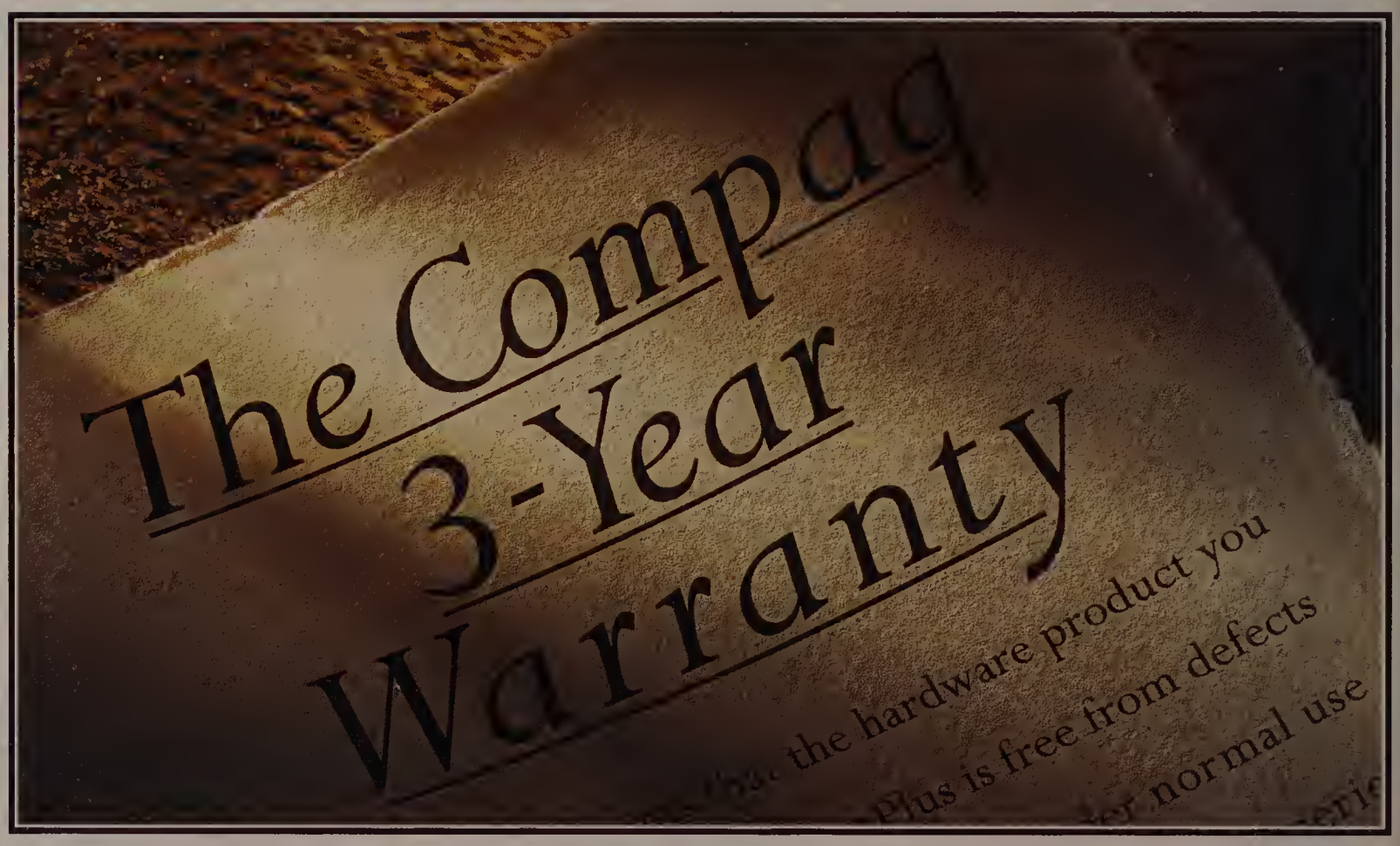

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Circle 35 on reader service card

spreadsheet, Improv is an impressive product. By its very nature, Improv forces you to structure your spreadsheet model, so for unstructured models, you'll be much better off with any of the other products. Excel and Quattro Pro both offer some of Improv's features, but if you need industrial-strength multidimensional data manipulation, Improv is certainly your best bet.

List price: $495; *Lotus Development Corp., 800/872-3387, 617/577-8500.*

Reader service no. 833

Microsoft Excel 5.0

PROS: Analysis tools, data modeling, OLE 2.0 support, Visual Basic for Applications

CONS: Text size doesn't adjust when you resize embedded charts, menus are drastically different from those in version 4.0

Excel has always set the Windows spreadsheet standard, and the latest version steps that standard up several notches, making it one of two worthy recipients of our spreadsheet Best Buy. Excel 5.0 has many usability enhancements, a new macro language, improved scenario management, and several new data analysis tools. This upgrade addresses the major problem with version 4.0: the lack of 3-D worksheets. Excel files can now have as many worksheets arranged in a workbook as system memory allows. These sheets can be normal worksheets, macro sheets, chart sheets, or sheets that hold custom dialog boxes. In addition, version 5.0 is one of the first applications to support the OLE 2.0 specification.

Microsoft made this program's features even more accessible to the new user. In version 4.0, Microsoft introduced the ChartWizard—a series of dialog boxes that guide the user through the steps to creating a perfect chart. There's even more wizardry in 5.0: a Text Import Wizard, a PivotTable Wizard, and a useful Function Wizard that significantly improves on version 4.0's Paste Function command by helping you with the function's arguments. In addition, Microsoft Query (the stand-alone database query tool that replaces Q+E) includes cue cards to assist you.

One of the more interesting new features is the TipWizard, which monitors your actions as you work. If you do something inefficiently, the TipWizard briefly explains the alternative method with a direct line to a help topic for more details. These tips keep accumulating until you're ready to read them (using the TipWizard tool bar), or you can turn the feature off entirely.

A lot of intelligent design went into the latest version of Excel. For example, querying a worksheet database has never been easier. Issue the Data•Filter•Autofilter command, and Excel determines the database for you. The field names turn into drop-down list boxes that display all unique values in each field. Simply select the values you want to see on screen, and Excel hides all records that don't qualify.

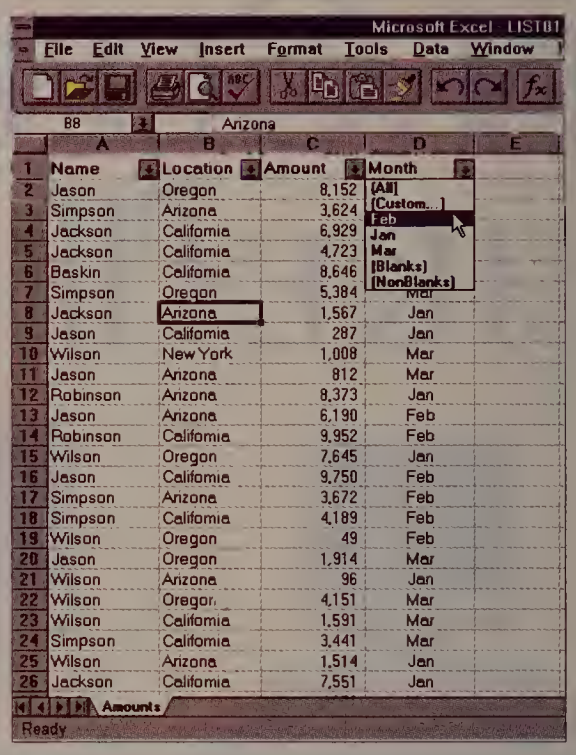
The program abounds with such intuitive features. For example, click the Sort icon, and Excel determines your data range based on the cell pointer's position and uses the current column as the sort key. Holding <Shift> while you click the icon performs the sort in descending order.

Excel 5.0 makes particularly good use of the mouse. Besides the now common drag-and-drop feature for copying and moving, there are several other mouse actions that auto-fill a range. You can drag a range of data into a chart, and the data appears as a new chart series. You can also use drag and drop to embed an OLE 2.0 object. If your mouse pointer hovers over any icon, a tiny message box pops up explaining that icon's purpose.

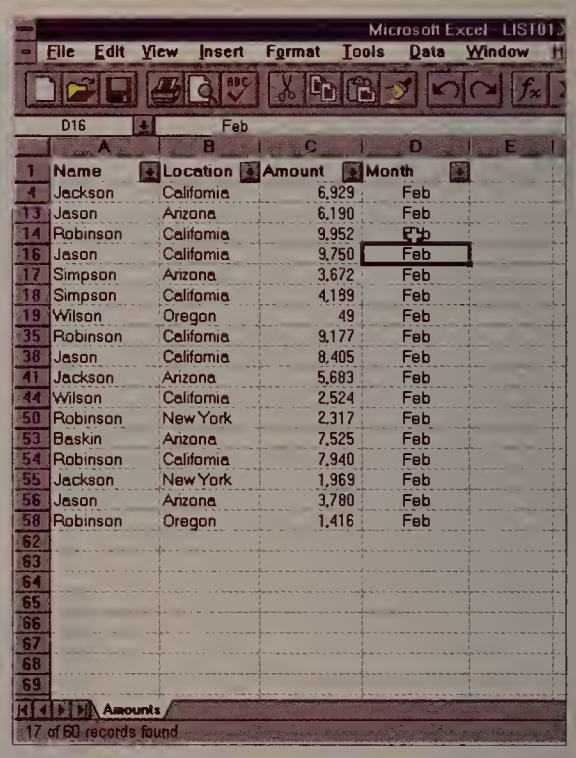
The new automatic subtotal feature is sure to be a hit with database mavens. A single command will insert subtotal formulas into a data range automatically. For example, if you sort the records in your sales database by region, Excel can automatically generate subtotals to show total sales by region. Excel can even create it in outline form so you can hide the details.

Excel 5.0 still supports the XLM macro language, but it also includes an advanced macro system based on Visual Basic for Applications (VBA). Although it's similar to Visual Basic (VB), it has lots of extensions. Casual users can record their actions while Excel generates VBA code. More advanced users can write code directly in a special Module sheet. You can create custom dialog boxes, or simply insert dialog box controls directly on a worksheet. In the latter case, you can link these controls to cells in a worksheet without writing any macro code. For example, you might want to add a small scroll bar that lets the user change the interest rate displayed in a cell. Manipulate the scroll bar, and the cell's value changes accordingly.

The new macro system omits some features, however. For example, VBA objects don't have as many properties as they do in VB, and you won't find VB's handy Properties window. Nonetheless, it's a powerful language and most will agree it's vastly superior to the former macro system. In addition, this language will eventually appear in all Microsoft applications, making cross-application macros possible.



EXCEL MAKES IT EASY to filter data. Select the Data • Filter command to change field names into drop-down lists, from which you choose the values to display.



AFTER FILTERING THE DATA TABLE, EXCEL hides all rows that do not meet the specified criteria.

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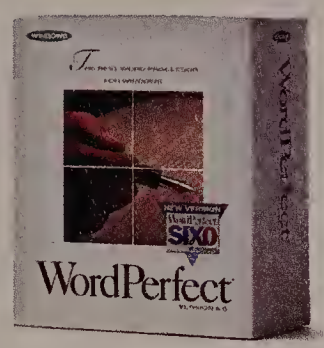
WordPerfect 6.0
for Windows
The latest version.



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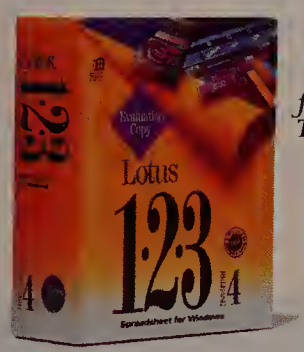

Lotus 1-2-3
for Windows R.4.0
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*Leasing is provided by GE Capital Services for a term of 36 months and is subject to approved credit and certain terms and conditions. Call for details. †Restrictions and exclusions apply. Monitors, battery packs and certain options are covered by a one-year warranty. ††CompuServe preinstalled with 30-day free trial membership. ©1993 Compaq Computer Corporation. All rights reserved. Compaq and the Compaq Logo Registered U.S. Patent and Trademark Office. ProLinea is a trademark and Compaq DirectPlus and Solution Paq are service marks of Compaq Computer Corporation. Products, prices and programs are subject to change without notice. Other products are trademarks or registered trademarks of their respective companies. Microsoft and MS-DOS are registered trademarks and Windows is a trademark of Microsoft Corporation. The Intel Logo is a registered trademark of Intel Corporation. Offer available in the U.S. only.

Circle 61 on reader service card

Although its functions don't have quite the breadth of those in Quattro Pro for Windows, Excel's analysis tools are strong. Consider Excel's charting capabilities. Like 1-2-3, Excel creates charts directly on a worksheet, but you can also store a chart on a special Chart sheet, which is useful if you want to print the chart separately. Formatting a chart is a breeze, and you use the same techniques and tool-bar icons as you do when formatting a worksheet. The product now also supports custom-named chart formats.

If there are any noticeable drawbacks in charting, it's the same problem Excel has always had: Text size doesn't change proportionately when you resize an embedded chart. Changing the size of an embedded chart can entail lots of reformatting.

Excel's user interface is remarkably consistent and intuitive. The menus and tool bars now correspond to those in Word for Windows whenever possible. This means that if you're moving up from Excel 4.0, you may experience some initial confusion over the new menu system. For example, the Formula •Define Name command is now Insert•Name•Define. Microsoft made these changes to improve interapplication consistency and also to streamline the commands. Once you become familiar with the new menus, you'll probably find them more logical.

Excel 5.0 is suitable for users at all levels. We performed tests with a preproduction version of the program, and test results were impressive, especially for recalculations. The only disappointing result was the relatively lengthy file-load time. These numbers may change with the shipping version of this program, although not by much.

We're hard-pressed to find any serious deficiencies in this product, which is expected to sell for $300 to $350 on the street. Spreadsheets just don't get any better than this. You know you're dealing with something special when you look forward to working—and don't be surprised if this happens to you when you start using Excel 5.0.

List price: $495; *Microsoft Corp., 800/426-9400, 206/882-8080.*

Reader service no. 834

FEATURES COMPARISON

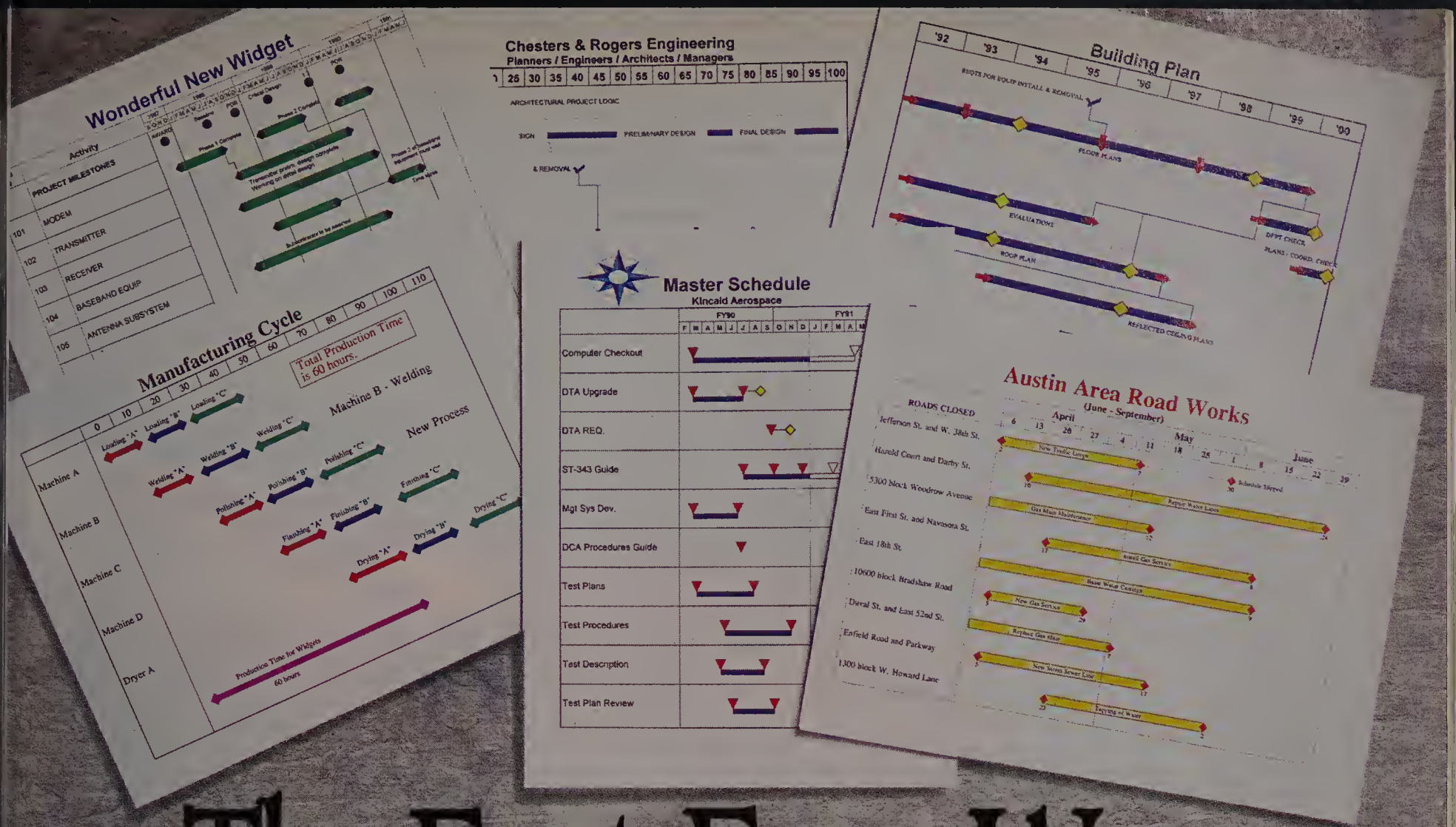
Windows Spreadsheets: More Than Just Number Crunchers

● Yes
○ No

	BEST BUY Borland Quattro Pro 5.0	Lotus 1-2-3 release 4.01	BEST BUY Lotus Improv release 2.1	Microsoft Excel 5.0
Standard features				
List price	$99.95[1]	$495	$495	$495
Disk space required (minimum to full installation)	10MB–23MB	7.5MB–13MB	7MB–13MB	8MB–23MB
Daily support hours	11	24	24	12
Ease of use				
Drag-and-drop copy and move	●	●	○	●
Select and name noncontiguous ranges	●	○[2]	○	●
In-cell editing	○	●	○	●
Interactive tutors	●	○	○	●
OLE client and server	●	●	●	●
OLE 2.0	○	○	○	●
Outliner	○	○	●	●
Analysis				
Total functions	373	226	161	318
Create custom functions	○	○	○	●
Array formulas	●	○	○	●
Compile formulas	●	○	○	○
Label-based worksheet consolidation	●	○	○	●
Automated scenario management	●	●	○	●
Nonlinear solver	●	●	○	●
Worksheet auditing tools	●[3]	●	○	●
Analysis of variance	●	○	○	●
Presentations and charting				
Automatic table formatting	●	●	○	●
Rich text-cell formatting	○	●[4]	○	●
Display text at angle	○	●	○	●[5]

	BEST BUY Borland Quattro Pro 5.0	Lotus 1-2-3 release 4.01	Lotus Improv release 2.1	BEST BUY Microsoft Excel 5.0
Presentations cont'd				
Vertical alignment in cell	○	●	○	●
Word wrap in cell	○	●	○	●
Center label in range	●	●	○	●
Group editing for multipage worksheets	●	●	○	●
Draw layer for worksheet annotations	○	●	●[6]	●
Edit charts on worksheet	○	●	●[6]	●
Automatic trend line in charts	●	○	○	●
On-screen slide show	●	○	○	●
Data access and manipulation				
Cross-tab reports	●	●[7]	●	●
Multidimensional data pivoting	●	○	●	●
Relational queries	●	●	●	●
Dynamic links to external database	●	●	●	●
Direct access to SQL databases	●	●	●	●
Customization				
Add dialog box controls to worksheet	●[8]	●[8]	●[9]	●
Modify menus	●	●	●	●
Dialog box editor	●	●	●	●
Macro command language	●	●	○	●
BASIC-like macro language	○	○	●	●

[1] $495 for Workgroup Edition.
[2] Select only.
[3] Limited.
[4] Not intuitive; needs embedded codes.
[5] 90 degrees only.
[6] Goes into a presentation window separate from the worksheet.
[7] Two-way only.
[8] Buttons only.
[9] Buttons only, and only in presentation window.



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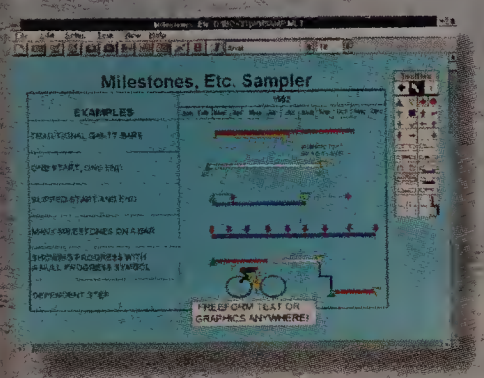

Put down that pencil. Chuck that clunky project management package. Because Milestones, Etc. works with your Windows software to give you a *better* way to track all your projects!

Praised by publications like *PC World* and *PC Computing* for its ease of use and flexibility, Milestones, Etc. 3.1 lets you create everything from simple Gantt charts to complex master schedule charts with dependent steps.

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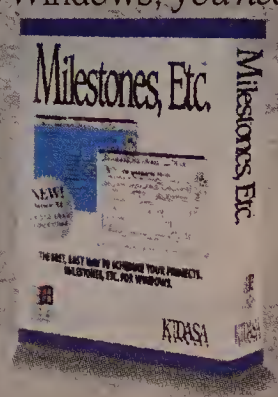

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The OverDrive processor improves the performance of all your applications. So you can fly through your overwhelming workload with the greatest of ease.

How does the OverDrive processor do it? Using Intel's innovative DX2 "speed doubling" technology, it runs internally at twice the speed of the rest of your system. So if you had a 33 MHz SX or DX Intel processor, you would now have a 66 MHz DX2 Intel processor.

*For European inquiries, call +44 (0) 793 431155, and ask for infopack IOD7.

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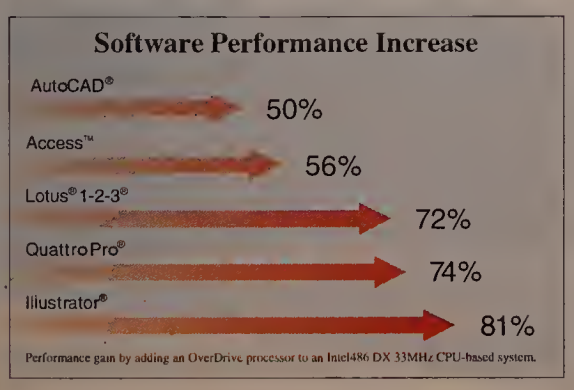
ware up to 70% more ka-boom.



Plus, the OverDrive processor is easy to install. Depending on your system, you can either plug it into the OverDrive socket or swap it with your original microprocessor. No problem.

To get a better idea of how the OverDrive processor boosts performance of your software, call 1-800-354-3112, Ext. 5730,* for a free demo disk. It could be the greatest show on earth.

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Circle 106 on reader service card

Beat the high cost of commercial software with these 42 useful, inexpensive business programs that you can try before you buy.

The Best of

Business Shareware

DAN PICASSO

Need software to help you manage your department or small business? Could you use a program that controls inventory, helps you set policy, or automates the payroll? There's some great software out there to do these jobs and more like them, and—best of all—it's available as shareware.

Shareware is software that anyone can legally and freely distribute, and that users don't have to pay for immediately. If you like a shareware program and decide to continue using it, you're expected to send its author a registration fee. Once you've registered a shareware program, you're likely to get the latest update, complete documentation, and other benefits that don't come with the freely distributed version. Shareware usually costs much less than commercial packages, and you should definitely pay the bill. Remember, you don't give away your goods and services and you shouldn't expect shareware publishers to do so, either. See "Acquiring Shareware" to find out how to get shareware programs in the first place.

To find the best in business-oriented shareware, I spent the better part of a month scouting commercial online services such as CompuServe, America Online, and GEnie, as well as private business-oriented bulletin boards from Virginia to California. I asked entrepreneurs about the shareware they use. I spent weeks unzipping, uncrunching, exploding, expanding, and evaluating scores of recent programs to select the 42 listed here.

By Peter Scisco

Business Planning & Management

Business Plan Master 2.7

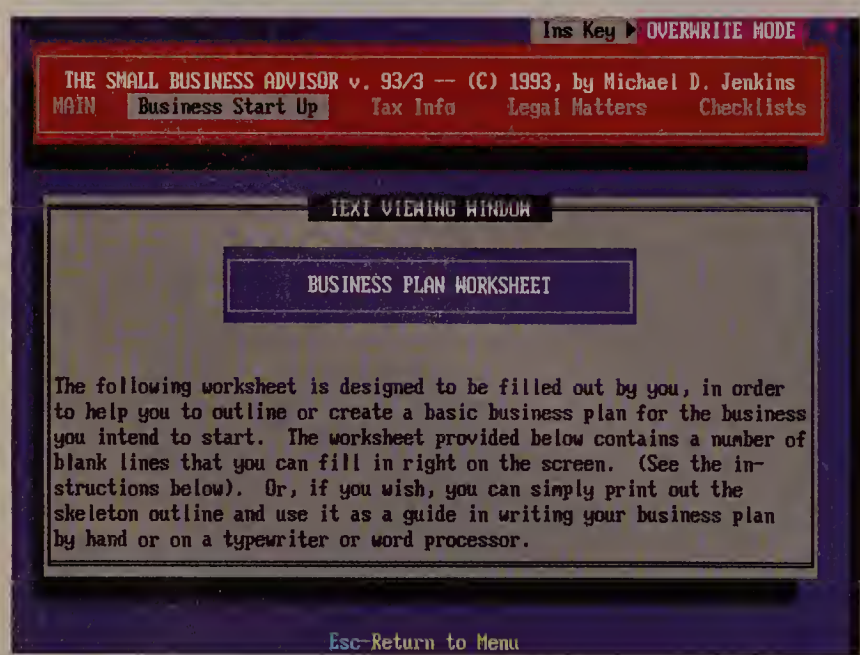
WINDOWS Starting any business more complicated than a lemonade stand requires a plan. You must know your numbers and use them in a proposal that makes sense to you and to potential lenders. Business Plan Master, a collection of financial templates for popular spreadsheets and word processors, will make lenders take your proposal seriously. These files document and calculate cash flow, start-up costs, assets, and income; they also figure a balance sheet and loan repayments, and do much more. It helps you provide a detailed history and analysis of the proposed business, the market climate, and the people involved. Available as BPMWIN10.ZIP on PC World Online and other online services. Registration fee: $34; a more complete version is available for $44. Grand Universal, 406/862-1280. **Reader service no. 760**

MoonLite 2.2

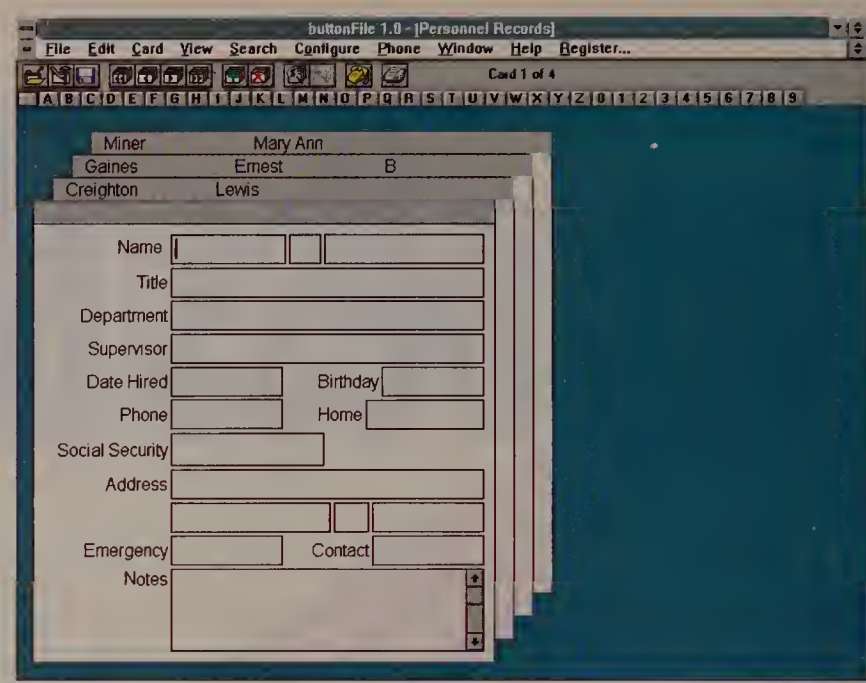
Business demands good ideas, and MoonLite can be invaluable for brainstorming. It leads you through setting a goal, defining weighted criteria for that goal, and listing assets helpful in getting there. MoonLite not only provides a step-by-step analysis, but sparks your creative thinking with randomly generated ideas. It will even mix and match ideas and assets—the space between the two is where you'll find the kernel of invention. It's available as MLTE22.ZIP on PC World Online and other online services. Registration fee: $30. CCI Ltd., P.O. Box 286, 6800 AG ARNHEM-NL, Holland; CompuServe, 70431,3525. **Reader service no. 761**

The Small Business Advisor

Need answers, but don't want to start your attorney's clock ticking? For about the price you'd pay for a billable hour, this program answers basic questions about taxes, employee relations, marketing, and other business-related subjects. The Small Business Advisor is conversant with many federal regulations, and is updated quarterly to include topical information. It's available as SBA93_4A.ZIP and SBA93_4B.ZIP on PC World Online and other online services. Registration fee: $19 to $99.95, depending on the information and features. Ronin Software, 206/391-4036. **Reader service no. 762**



YOU CAN GET ANSWERS TO YOUR BUSINESS QUESTIONS using the automated Small Business Advisor.



EASY DATABASE MANAGEMENT: ButtonFile offers a cheap and easy way to manage data in Windows.

Contact Management

AddPhone 3.2

This contact manager is flexible and powerful, letting you adapt it to a variety of needs. For instance, you could add home address and start date fields to your employee records if need be, then use those custom fields for sorting and searching. Extras include auto-dialing and a robust printing feature that uses popular and custom-designed formats for everything from paper organizers to mailing labels. AddPhone will run as a TSR in less than 7K of RAM. ADDPHN.EXE is available on PC World Online and other online services. Registration fee: $29.95. Ladew Co., 818/883-9099, 818/883-3061 (fax). **Reader service no. 763**

Contact Plus Personal 2.5

The information overwhelming most managers is the digital equivalent of the Mississippi overflowing its banks. Contact Plus, which can be tailored to fill almost any service organization's needs, will help you sandbag your business. It tracks phone calls, documents, forms, expenses, billing—almost anything a legal office, real estate agent, sales office, or telemarketing firm can create. The built-in word processor is handy for form letters, but there's also WordPerfect for DOS mail-merge support. The program can run memory resident as a pop-up. CPLUS25.ZIP is available on PC World Online and other online services. Registration fee: $99. Contact Plus Corp., 800/366-9876, 407/779-4900, 407/779-3311 (fax), 407/779-4422 (BBS). **Reader service no. 764**

Databases

buttonFile 1.0

WINDOWS The thought of mastering a database gives me the cold sweats. But even I can face this extremely simple Windows program. ButtonFile sports several ready-to-go templates, including Personnel Records and a Rolodex. True to its name, the program's toolbar is loaded with buttons for file operations, report making, and the like. And buttonFile comes with scores of ready-made report forms as well as an easy designer for creating your own. This database can be up and running in less than 10 minutes—now that's productivity. You'll find BF10A.ZIP, BF10B.ZIP, BF10C.ZIP,

BF10D.ZIP, and BF10E.ZIP (all five files are necessary) on PC World Online and other online services. Registration fee: $69.90. ButtonWare, 206/454-0479, 206/454-1838 (fax). **Reader service no. 765**

Foxy Troxy Lite 1.0

If you're keeping your own inventory or tracking that of companies you buy from, Foxy Troxy Lite can save you time and pain. The program registers product codes, categories, and individual inventory items with discount and retail prices, date of last quote, descriptions, manufacturer, and even shipping costs. And you can quickly pull out reports and views of your data as needed. The whole deal is yours for only a couple of sawbucks; that ought to boost any manager's bottom line. Look for FTL10A.ZIP, FTL10B.ZIP, and FTL10C.ZIP (all three files are necessary) on PC World Online and other online services. Registration fee: $20. Encourager Software, 813/647-5742. **Reader service no. 766**

WAMPUM 4.5

What's better than a dBASE III-compatible, relational database program that you can run as a TSR in 20K of RAM? A dBASE III-compatible, relational database program that you can run as a TSR in 20K of RAM and that costs only $50. That's WAMPUM, which also gives you a menu-driven interface and enough power to create your own applications. You can even link PCX graphics files to your database records—great for displaying an item on screen for your customers. Some dBASE experience is highly recommended. It's available as WAMPUM45.ZIP on PC World Online and other online services. Registration fee: $50. Ward Mundy Software, 404/237-9420, 404/237-1167 (fax), 706/746-5109 (BBS). **Reader service no. 767**

Document Management

100 Letters

✓FREEWARE Ever at a loss for words when composing business correspondence? Why not use this collection of standard business letters to help you write everything from an acknowledgment for an order to a request for a delinquent payment? The letters—professional in quality and tone—are documented ASCII files that you can easily drop into whichever word processor you prefer. 100LTRS.ZIP can be found on PC World Online and other online services.

DayFlo Tracker Lite 3.1a

You probably spend too much time tracking paper and people, and this little program can help. DayFlo Tracker Lite comes with a text editor for writing notes, letters, and reports, as well as an auto-dialer that helps keep you in contact with clients and co-workers. For contact reports, articles, research, and mailings, it would be hard to beat DayFlo Tracker Lite's excellent features and overall performance. DAYFLO3A.ZIP is available on PC World Online and other online services. Registration fee: $65. DayFlo Tracker Corp., 714/474-2901. **Reader service no. 768**

PC-Forms 6.29

A great tool for creating documents and saving them as templates, PC-Forms is essentially an electronic forms library that merges boilerplate text with field names that you fill in on the fly. The interface is nothing to write home about (although you could, using the built-in editor), but it works. You'll find PCFMS1.ZIP on PC World Online and other online services. Registration fee: $35 (network and multiple system license pricing is available). Bill Blackledge, 405/840-3563; CompuServe, 70162,1130. **Reader service no. 769**

Financial Management

SBA Loan Planner 2.51

Thinking of expanding your small business, but unsure of the loan terms offered by the Small Business Administration? Don't feel bad about it—the quagmire of federal loan terms would give fits to the Keating 5. But with the handy SBA Loan Planner, all you have to

Acquiring Shareware

Where do you get shareware? If you're a member of either CompuServe or America Online, you can find all of the programs discussed here in one convenient place: the PC World Online Forum. On CompuServe, just type GO PCWORLD at any DOS prompt. On America Online, press <Ctrl>-<K> and enter the keyword PCWORLD.

You'll also find shareware on other commercial online services, as well as on private bulletin board services (BBSes). And if you don't have a modem, there are shareware distribution companies that will send you unregistered shareware on floppies or CD ROM. Just remember, when you "buy" shareware from one of these companies, you're paying only a distribution fee; you're still expected to register any program you decide to keep.

Finally, you can get shareware directly from the author, either by mail or through a BBS. That way, you'll be sure to get the most current version.

Online Services and BBSes

America Online
800/827-6364, 703/448-8700 (for online membership)

Channel 1
617/354-8873 (BBS)

CompuServe
800/848-8199

Exec-PC
414/789-4210 (BBS)

Executive Network
914/667-4567 (BBS)

HH Info-Net
203/738-0342 (BBS)

PC World Online
See page 12 for information on joining PC World Online.

Shareware Distributors

EMS
301/924-3594,
301/963-2708 (fax)

PC-SIG
800/245-6717,
408/730-9291,
408/730-2107 (fax)

Public Brand Software (PBS)
800/426-3475,
317/856-7571

Public Software Library (PsL)
800/242-4775

Software Excitement
800/444-5457,
317/286-3182

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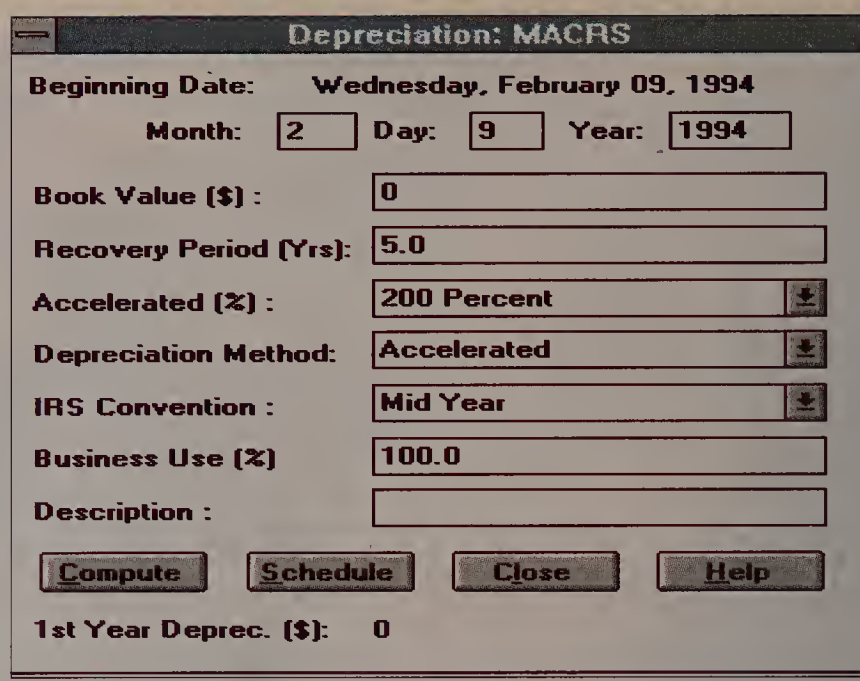
do is plug in the numbers to get a pretty good idea of the final terms. The program calculates terms according to weighted averages (used by the SBA when money is divided for different purposes—such as inventory and salaries). Reports based on several scenarios tell you what you can expect during the planning stages of business expansion, when you need the answers most. The file is available as SBAPLN.ZIP on PC World Online and other online services. Registration fee: $20. Ward Harrington, Ste. E3422, 601 Van Ness Ave., San Francisco, CA 94102; CompuServe, 70570,1120. **Reader service no. 771**

Business Calculator 2.2

WINDOWS An important client has set a deadline and you have to marshal your staff and resources. Quick, how many days do you have? Business Calculator can give you the answer in a flash. It can also help you figure out bond yields, straight-line depreciation, accelerated payments, amortization tables, investments, and call-and-put option pricing. A full range of statistical and business functions, a tape, and handy conversion charts go into this solid desktop tool. It's available as BCALC22.ZIP on PC World Online and other online services. Registration fee: $25. Etling Software, 1219 N. Rutland, Wichita, KS 67206. **Reader service no. 770**

Financial Analysis for Windows 3.17

WINDOWS No manager should be without a spreadsheet, but sometimes all you need is a quick way to run a few numbers. Financial Analysis for Windows can help, with its 16 minianalysis programs. All you have to do is fill in the blanks and Financial Analysis will tell you how your choices will affect the bottom line. Financial worksheets include Auto Lease, Compound Interest, and Retirement Payout, as well as calculations for Bonds, T-Bills, Annuities, and Rate of Return. This utility, available as WINFIN1.ZIP on PC World Online and other online services, will run the numbers before you run to your CPA. Registration fee: $39, plus $5 shipping. Gjetaas Inc., 206/599-2418. **Reader service no. 772**



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Bargain Business Information Via Modem

To update an old chestnut from the eighties, "the one with the most information wins." Timely information can make the difference between managing a business and mangling the bottom line. Here are a few online places where—if you have a modem—you can access useful business information for free or for very reasonable rates.

SBA BBS

Believe it or not, the federal government is actually doing something for small businesses. The Small Business Administration sponsors a toll-free BBS with information on subjects ranging from minority issues in small business to IRS assistance. SBA publications, 1992 census data, a list of congressional representatives, and other government information are all there for the downloading. Call 800/697-4636 for 9600-bps access, 800/859-4636 for 2400-bps access, and 800/827-5722 for voice information.

Microsoft Small-Business Center

On this America Online forum you'll find helpful articles about business planning, exporting, finance, and marketing from organizations like the U.S. Small Business Administration, the U.S. Chamber of Commerce, the National Federation of Independent Business, and others. The articles are free for reading or downloading, except for the usual connect-time charges. The Microsoft Small-Business Center also sponsors Wednesday night conferences with the Service Corps of Retired Executives, from 7 p.m. to 11 p.m. EST. Use the keyword MSBC.

Fedlinx ALIX II

Although the mission of the ALIX (Automated Library Information eXchange) BBS is to serve federal libraries, businesspeople can find useful articles here, especially relating to new federal reports and regulations. Here's where you'll find Vice President Gore's National Performance Review Report (about "reinventing" government), as well as the text of the Americans with Disabilities Act. Access is at 202/707-4888 (2400 bps), or 202/707-2885 for speeds up to 14,400 bps.

The Business Wire

CompuServe subscribers can get a handle on what's happening in mergers and new products by logging onto The Business Wire. Hundreds of companies forward press releases, news articles, and other information to the wire for downloading or online reading. Company press releases can't replace news reporting and financial analysis but they do provide concise information. Type GO TBW.

Entrepreneur's Forum

While on CompuServe, stop by the Entrepreneur's Forum for discussions and tips on a wide range of small-business topics, from marketing strategies to franchise opportuni-

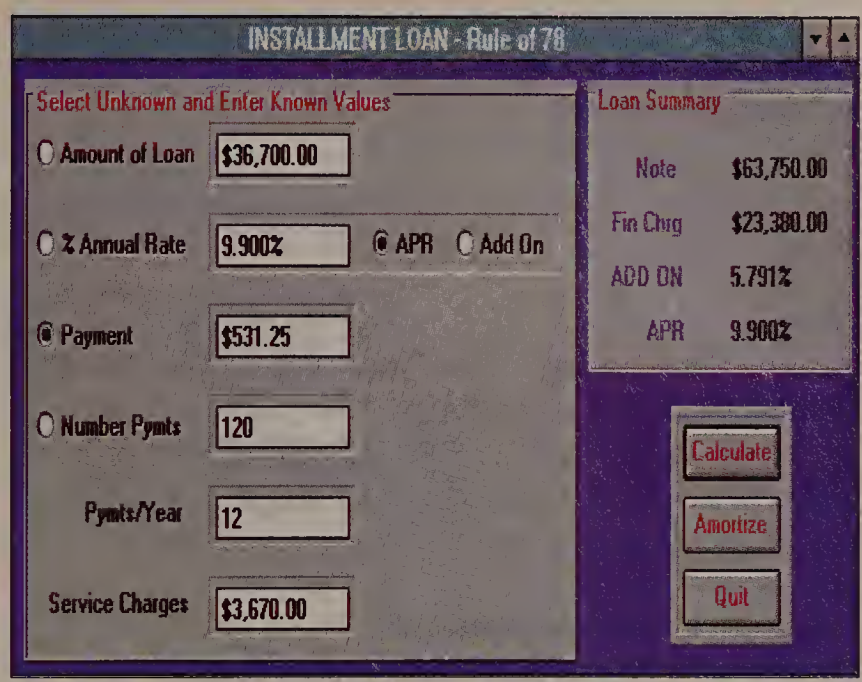
Inventory

Inventory Control Program 10.0

This handy program gives you extensive control over inventory, supplies, orders, costs, and sales, all for a low $65. Inventory Control's record/field interface is easily navigated, even without mouse support, and it comes with 15 reports—from Inventory Order to Purchase Order Year to Date—that you can print, view, or save to disk. You can trigger purchase orders automatically based on a running count, or create them on the fly from your product database. The program supports multiple office locations, and either last-in-first-out (LIFO) or first-in-first-out (FIFO) management. ICP10.ZIP is available on PC World Online and other online services. Registration fee: $65. Spirit7 Software Corp., 703/943-4635, 703/949-4464 (BBS); CompuServe, 73530,3236. **Reader service no. 773**

Track-It 3.05

This program will erase any doubts you may harbor that shareware has what it takes to handle big jobs. Track-It is a comprehensive inventory control and point-of-sale system that can run on a single computer or a network. The program is completely mouse driven (although keyboard input works fine), offers thorough, context-sensitive help, and works with invoicing, shipping, purchase orders, and receiving. It also helps you track inventory, make sales, and keep stock on customers and goods. Track-It has a solid report generator, an attractive presentation, a short learning curve, and a low cost—and that's the target of any competitive business. Look for Track-It as TRKIT305.ZIP on PC World Online and other online services. Registration fee: $149. Millennium Software, 510/828-5892, 510/828-4153 (BBS); CompuServe, 72560,2466. **Reader service no. 774**



DON'T BOTHER SETTING UP A SPREADSHEET. Run your numbers through Financial Analysis Instead.

Miscellaneous

Grot Inc. 3.1

When I started researching this article, I never expected to include a game, but Grot Inc. is a great way to test and train anyone in line for a management position. This retail management simulation pits up to four players, acting as store managers, against each other in a game of high profit. Each player must make decisions on gross margin, expenses, how much merchandise to put on sale, and other factors that spell the difference between profit and the poorhouse. Some decisions have immediate effect; others may take longer to pan out. The player with the highest net worth at the end of the game wins. You'll find GROT31.ZIP on PC World Online and other online services. Registration fee: $30. P.K. Winter, 69 Summerhill Ave., Toronto, Ontario, M4T 1A9; CompuServe, 71213,1337. **Reader service no. 775**

World Time

✓FREEWARE Global competition and international alliances are making the world a smaller place—but you still shouldn't roust your Middle East distributor out of bed at 3 a.m. Set World Time for your city and local time, and you'll soon know the time in Acapulco and Zhuhai—and scores of cities in between. Simple, small, easy, and free—just what your business needs. It's available as TIMZON.ZIP on PC World Online and other online services.

ties. Seasoned pros and eager beginners share their views on creating the right products or services, and on reaching a potential audience. The forum also offers an excellent collection of business-related shareware. Type GO ENTMAGAZINE.

Business Resource Directory

Supported by the National Small-Business Network, the Business Resource Directory on GEnie covers such diverse areas as small business, home office entrepreneurs, telecommuters, agencies and associations, and government offices. This is a great place to find a particular service bureau in your area, or a supplier of a particular product. And you can list your own company within the directory. The cost for using the Business Resource Directory is $12.50 an hour weekdays from 8 a.m. to 6 p.m. and $3 an hour all other times—surely one of the lowest-cost databases around. Type DIRECTORY at GEnie's prompt.

WorkPlace RoundTable

The art of managing a business is a difficult one, and the competent manager always welcomes good advice. You will find plenty of it, plus a place to give out some of your own, on GEnie's WorkPlace RoundTable. This extensive resource for managers covers topics such as the changing workplace, managing people, business regulations, and management trends. You won't have to pay online charges beyond the monthly fee, and there is some great business shareware to be found. The RoundTable boasts an extensive library of business shareware. To get started, just type WORKPLACE at GEnie's prompt.

Information USA

Subscribers to CompuServe can tap into the data and analysis supplied by thousands of government agencies if they GO IUS. From national employment statistics to trends in health care, you can use this up-to-date information to help shape your own thinking about management issues. In addition, Information USA lists business-related BBS numbers, provides access to government publications, and offers possible sources of money (including various grant and loan programs). If you need information but aren't completely sure where to look, this is a solid place to begin. Type INFOUSA.

Order Entry and Invoicing

Bob's Invoice Program 2.0

This quick and easy invoice program is just the thing for a small business. It links orders, inventory, and clients so that you can create invoices on the fly or from a prepared list. Creating an invoice is a simple procedure: just type a customer number or select from a list of clients. Add shipping costs and tax, then select the applicable products and services from a list or enter them directly. The program prints invoices in text or graphics format, and even prints mailing labels—all for less than 10 bucks. INVOIC.EXE is on PC World Online and other online services. Registration fee: $9.95. Blue Moose Software, 603/942-9917. **Reader service no. 776**

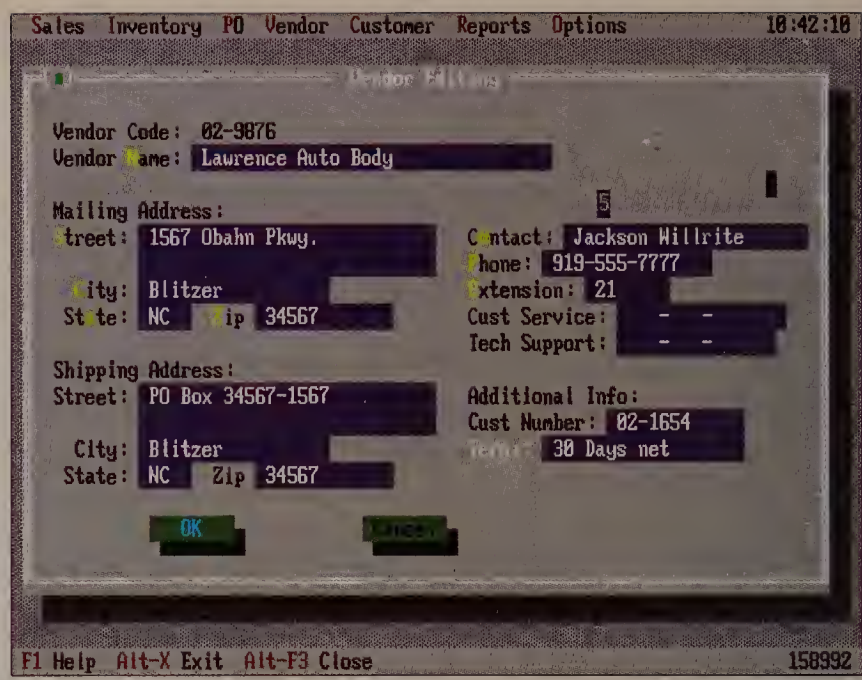
Customer Order Management System 1.3

Keeping your warehouse stocked to the rafters isn't too smart in this day of just-in-time inventory. The Customer Order Management System is a mouse-driven, easy-to-learn solution for managing customer orders from purchase to shipping, and can really help keep inventory low but fluid. The program supports multiple customers and line-item orders, and keeps tabs on the order process from start to delivery. Back orders, delivery schedules, and customer invoice information are all available for printing or for viewing on screen. A pop-up calendar and calculator help when you're scheduling shipments and writing invoices. COMS13.ZIP is available on PC World Online and other online services. Registration fee: $69. Beshears Software Associates, 205/442-6630. **Reader service no. 777**

People Management

Personnel Supervisor

Robust enough for personnel managers in small- to medium-size businesses, Personnel Supervisor keeps records for up to 35 employees. It not only stores vital information, but alerts you to pending performance reviews, tracks attendance and scheduled leave, keeps tabs on sick time, and assists in salary budgeting. When you need to, you can generate individual employee reports based on salary, job description, attendance, veteran status, or other criteria. The result is better evaluations, in-time performance reviews, and a more satisfactory work environment. If you require more substantial record keeping, the company has a more robust commercial program. You'll find PSUPER.ZIP on PC World Online and other online services. Registration fee: $35 plus $4 shipping. MST Software, Mortgage Service Tools Inc., 714/837-3664, 714/768-0736 (fax). **Reader service no. 778**

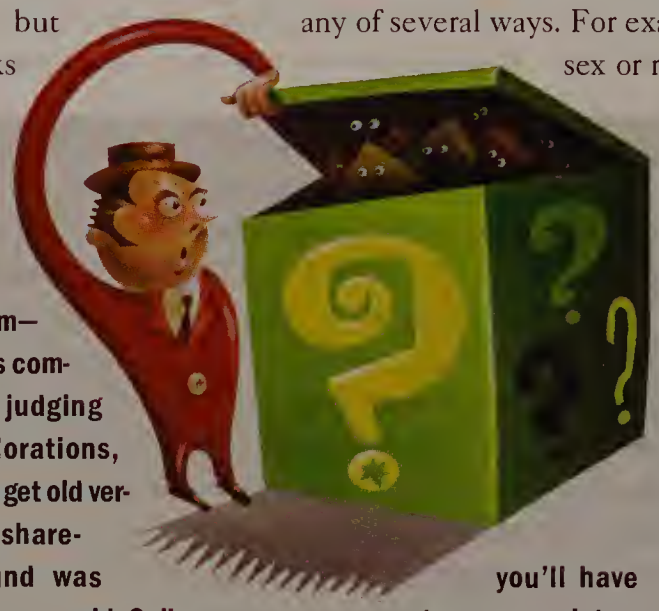


POINT-OF-SALE and inventory control are made easy with Track-it.

MyPeople 1.4

This simple database can maintain personnel information for up to 1000 employees, and it can organize employee lists for reports in any of several ways. For example, it will group employees by sex or race to help examine your compa-

Buying From the Bins



Want to buy software cheap? Many computer stores sell shareware and low-cost commercial software in bargain bins. But is this a wise place to buy?

In some stores we found unpackaged shareware for about $3 a floppy (and yes, you could get several programs on one disk or pay $6 for one program on two). The price is misleading, as you still have to pay for your shareware later if you like it.

Acquiring shareware in stores is certainly easier than downloading it—especially if you don't own a modem—and the cost is comparable. But judging from our explorations, you're likely to get old versions; some shareware we found was more than four years old. Online, on the other hand, you're bound to find the latest thing.

And if you see attractively packaged programs on racks, selling for $5 or $6 a pop, watch out: They're probably shareware, and may not be well marked as that, either. In these cases, you're paying for packaging, and you'll have to pay a registration fee if you use the program.

Commercial software was in some of the bins, but most of it was also long in the tooth, dating back as far as 1988. New or old, you won't find professional power in a $9 desktop publisher or an $11 integrated program, but if your needs are simple, you may find something worthwhile.

We also found used copies of better-known software at somewhat higher prices. WordPerfect 5.1 went for $149, while a much older word processor, Ashton-Tate's MultiMate Advantage II, cost only $39.95. But much of the used software, including these two bargains, came without registration cards, making it questionable whether you would ever get support for them. Buying from the used-goods bins is definitely a gamble.

—Lincoln Spector

Russell Glitman, Laurianne McLaughlin, and Randy Ross went shopping for this article.

POKER CHIPS, SLED DOGS, AND DUCKS ON CRUTCHES

(WE'LL USE WHATEVER WE HAVE TO TO DEMONSTRATE THE ADVANTAGES OF LOTUS SMARTSUITE.)

ny's hiring trends and practices. The program's Time Card feature records hours worked, sick time, vacation time, holidays, and other scheduling situations. You can master MyPeople's basic forms and reports in less than an hour. Look for MYPEOPLE.ZIP on PC World Online and other online services. Registration fee: $40. RAD Software, 706/660-0119. **Reader service no. 779**

Punch 2.0

WINDOWS This dandy little Windows utility gives workers a handy way to punch out when they leave the office and punch in when they return. Co-workers can then see which staffers are out, where they are, and when they plan to return. It's easy to set up and works fine on a network. Best of all, if you have five or fewer employees, it's free. Otherwise, registration is $49 for up to 10 users, $79 for up to 50, and $99 for up to 100. You'll find PUNCH1.ZIP on PC World Online and other online services. The VisAeon Corp., 914/939-2579. **Reader service no. 780**

Sign Out Board 4.1

Do you really want a program called SOB.EXE? If your business requires you to know when employees are at their stations (vital information in retail and service companies), you may need SOB to track them. You place the program on your network, and employees easily sign out and in with a few simple keystrokes. In many companies, it's impractical for workers to leave their desks to consult a board hanging on a wall in the reception area; now they don't have to. SOB.ZIP is on PC World Online and other online services. Registration fee: $25. CompuTorii Computer Services, 707/442-4365. **Reader service no. 781**

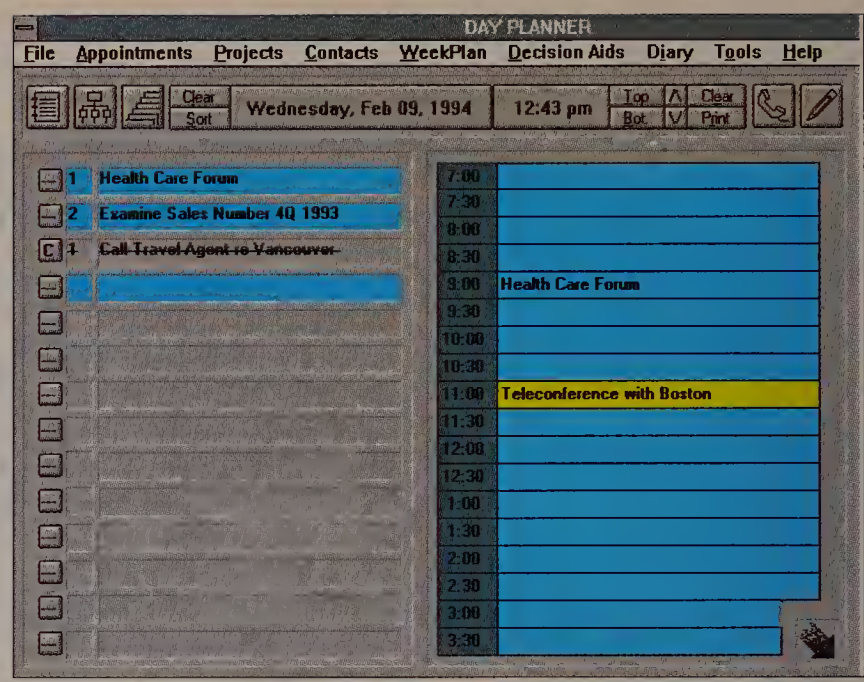
Personal Information Management

Achievement Planner 3.0

WINDOWS Achievement Planner is more than just a PIM, although it offers the full complement of to-do list, contact manager, and appointment scheduler. The versatile program also includes a project planner for delegating jobs among staff, noting specific action items, and setting deadlines. You can't get Gantt charts, but you can print detailed reports that outline action items—great for following up on meetings. You can promote tasks to projects, move tasks to the to-do list, and bring to-do items into your appointment book by dragging and dropping appropriate items. APIM3.ZIP is available on PC World Online and other online services. Registration fee: $39.95. Human Development Systems, 908/668-1991. **Reader service no. 782**

Business StartManager 4.0

This graphical DOS PIM has fine tools and an easy point-and-click interface. The standard options are here—calendar, phone book, to-do list, and daily planner. Plus, there's a free-form text database and a journal for reflections and brainstorming. Hard-core DOS users who shun the mouse can get to all the program's functions with just a couple keystrokes. You can dial directly from the Phone Book, but calls aren't logged automatically—you'll need to launch one of the program's other modules to make notes. Its only major drawback is the editor's lack of word wrap. BPIM40.ZIP is on PC World Online and other online services. Registration fee: $24.95. John Linnabery, P.O. Box 247462, Columbus, OH 43224. **Reader service no. 783.**



TURN TO-DO ITEMS into appointments by dragging them into Achievement Planner's Day Planner.

Policy

Employee Handbook

Nobody likes to read employee manuals, but woe to the company that fails to supply one. A good written set of rules serves as a guide to productive worker-employer relations, presents company policies in a consistent manner, and protects workers and management. The Employee Handbook package is an outline that helps you build a successful employee guide. In an environment as litigious as worker-management relations, no business—no matter how small—should go without an employee handbook; now you can write your own. Available as EMPHNDBK.TXT on PC World Online and other online services. Registration fee: $25. Holzschu, Jordan, Schiff, and Associates, 313/476-6907. **Reader service no. 784**

QRS Corporate Software Utilization Policy

Software programs are protected by copyright, and unlicensed copying is a felony. Companies should make sure that employees know what the law is, and that they understand the company's policy. This outline—straight text that any word processor can read—will help you create such a software policy. It describes what the law is, provides a statement of standards the company expects employees to follow, and describes the action a company might take against workers who violate those standards. You'll find POLICY.ZIP on PC World Online and other online services. Registration fee: $10. The Maple Leaf Project, 617/421-5501. **Reader service no. 785**

Presentations

Lecture for Windows 1.02

WINDOWS While not as ambitious as some of the more expensive presentation tools, Lecture for Windows is good for creating text-based presentations from any word processor that is capable of saving files in ASCII format. Lecture lets you concentrate on six basic commands that put titles and subtitles on the screen while defining colors, point sizes, and a limited number of special effects. It will take a little effort for you to learn the program's script language, but once you have the hang of it, you will be able to create dynamic presentations at the drop of a hat. Just don't expect to get fancy templates, mind-spinning visual effects, or stereophonic

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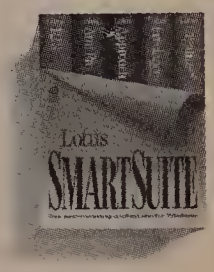

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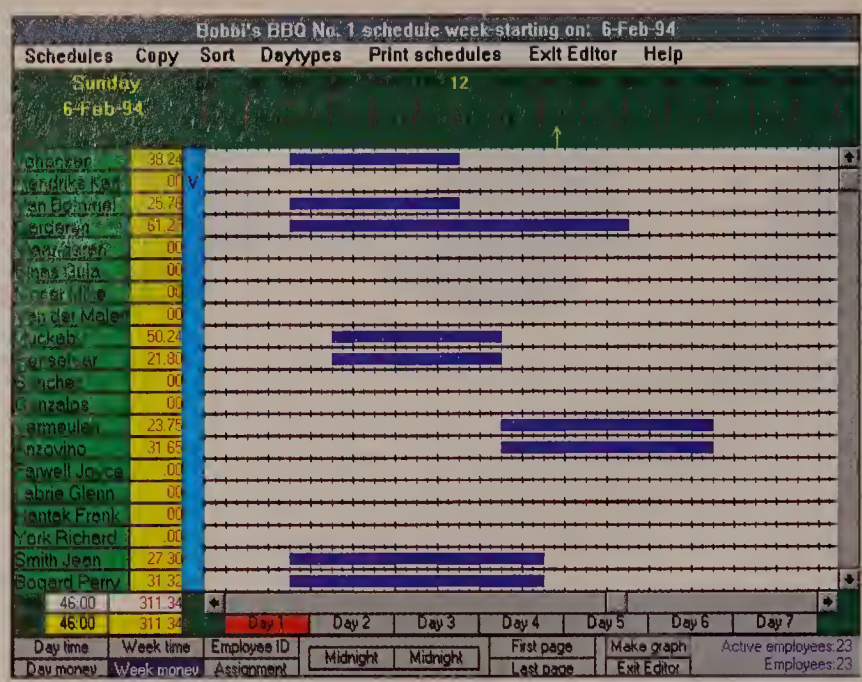


MAKING SCHEDULES THE EASY WAY: Drag workers' hours along a graph within Scheduling Employees for Windows.

sound. Look for LECTUR.ZIP on PC World Online and other online services. Registration fee: $29. Barn Owl Software, 618/632-7345, 618/632-2339 (fax). **Reader service no. 786**

Softline Brochure for Windows 3.3

WINDOWS Looking for a quick and easy way to make your ads and presentations stand out? Brochure links BMP pictures and WAV sounds in an online, self-running presentation that will fit on a floppy disk. In addition to sights and sounds, Brochure also presents a Windows Write file for your text. You or your client will need a Windows 3.1 machine to run the presentation, but Brochure will use the internal PC speaker if nothing better is installed. BROCH3-.LZH is on PC World Online and other online services. Registration fee: $99.95. Softline Inc., 206/861-5463. **Reader service no. 787**

SuperShow III

You can still do captivating multimedia presentations without Windows. SuperShow III takes PCX or GIF files, connects them to sounds and recordings (if you have a SoundBlaster-compatible audio card), and wraps up the whole package with hundreds of transitional visual effects. SuperShow III lacks the point-and-click ease of Windows presentation packages, but its menu system and dazzling effects make it a formidable weapon anyway. A run-time module goes to registered users. SSIII.ZIP is available on PC World Online and other online services. Registration fee: $89.95. PC West Software, 602/992-0310. **Reader service no. 788**

Profit and Loss

Basic Bookkeeping 1.1

Business success comes down to one thing: income and expenses. Actually, those are two things. But Basic Bookkeeping keeps track of both and helps you find the space in the middle, where your company's financial health lies. Avoiding hard-to-understand financial jargon, this program gives you a single-entry system for entering expenses and income, and offers quick profit and ledger reports that are especially useful for small businesses. If you're already using Quicken or another computer-based accounting program, there's no reason to adopt Basic Bookkeeping. But if you're writing checks by hand and keeping receipts in a desk drawer, check out OBBK11.-ZIP on PC World Online and other online services. Registration fee: $39. 'Otto-Williams Ltd., 301/306-0409. **Reader service no. 789**

BreakEven 1.02

✓FREEWARE The break-even point is the line at which there is no profit or loss. Get above the line and you're doing well; fall below and you're in trouble. BreakEven 1.02 performs simple analysis with very basic information: Enter your net sales revenue, your gross profit margin, and your fixed expenses,.and the program defines your break-even point. With more information it will display a point-by-point breakdown of where your business loses and where it gains. BE102.ZIP is available on PC World Online.

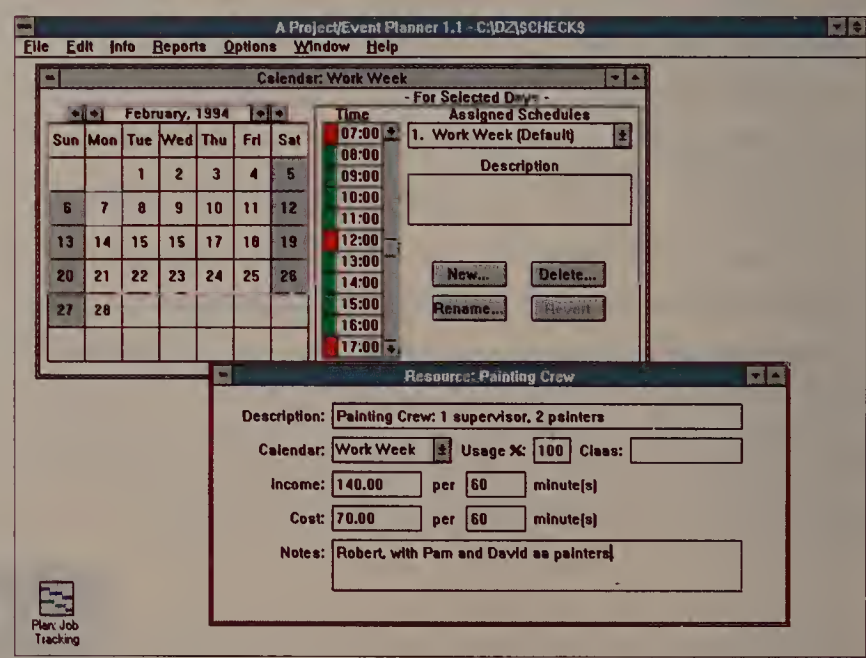
Forecasting CashFlow for Business Loans

✓FREEWARE By previewing your financial ups and downs, Forecasting CashFlow helps you gain a perspective on the financial strength of your company. Developed by the Small Business Administration and the National Business Association, this program works like a spreadsheet; enter cash-on-hand and cash-receipt expectations, and it balances them against such expenses as wages, repairs, and supplies. Two columns for each month of the year display estimated and actual figures. Totals for cash in, cash available, and cash out give managers a quick sketch of their business finances. Look for CASH.EXE on PC World Online.

Scheduling

EZ-STAFF 1.0

Working with young employees or trying to come to grips with the new Family Leave Act can require serious juggling skills. EZ-STAFF handles all the chores of setting up, editing, and printing employee schedules. The program lets you enter the hours that specific employees are unavailable, which is especially useful when scheduling students or parents. In addition, it tracks and schedules absences due to sick time, vacation, or personal leave. EZ-STAFF can alert you to scheduling conflicts, and automatically reflects changes made to the schedule. The program doesn't track historical statistics, and its DOS interface requires some time to master (a Windows version is under development), but it makes scheduling



TIME AND MONEY means tracking projects when you're using a program like Project/Event Planner.

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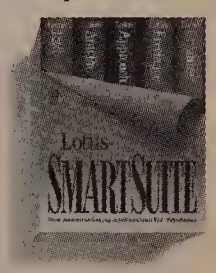
SmartSuite's Application Manager lets you move between the five products seamlessly. Click a SmartIcon® to launch a new application. Pull addresses and data from Approach® right into Ami Pro® using a simple mailmerge.

Or use Collect and Copy to gather all the data and charts you need from 1-2-3® and bring them into an Ami Pro document, forming a live link through OLE and DDE, so that any change to the spreadsheet is automatically changed in the word processing document. It sounds impressive – and it only took you one click to do it.

Maybe the most important thing about Lotus's integrated suite of applications is that it's all integrated into a single box you can actually buy. Right now. Upgrade from any Lotus or competitive product to SmartSuite 2.1 for just $299.* Visit your Lotus Authorized Reseller or call Lotus direct for a demo disk at **1-800-TRADE-UP, ext. 9377.****



The cards are on the table. Go with the winning hand.

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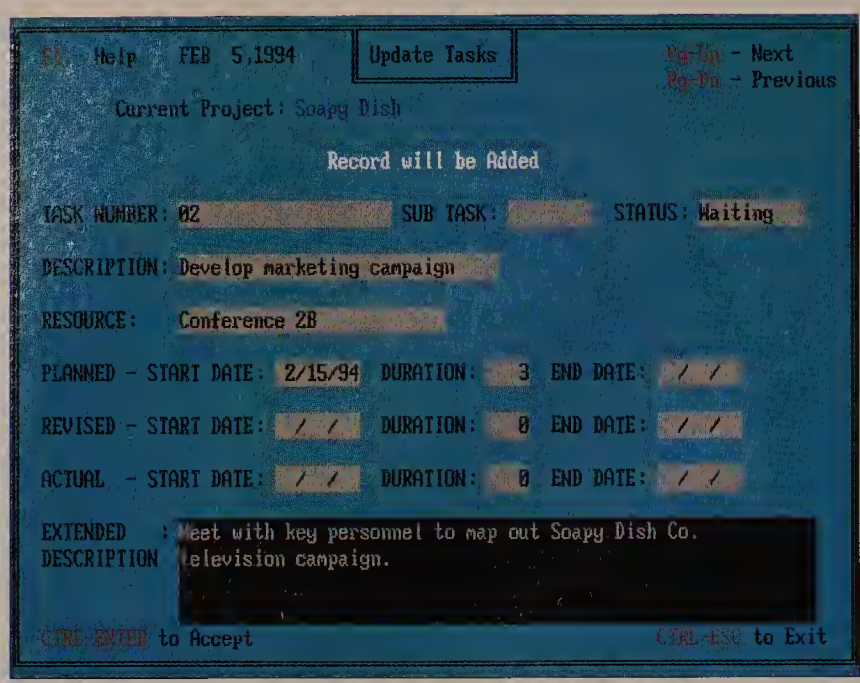

STREAMLINE TASKS AND JOBS with Bill Moore's Taskman.

a whole lot easier. EZSTAF.ZIP is available on PC World Online and other online services. Registration fee: $30. K Baliff Inc., P.O. Box 3367, Conroe, TX 77305-3367. **Reader service no. 790**

Scheduling Employees for Windows 2.0

WINDOWS This program shows why Windows has become standard equipment: It makes assigning hours as easy as dragging a sliding bar across a graph. Within the schedule window, managers can see how many daily and weekly hours each employee is contracted to work, and what the individual and total labor costs will be for a week or a specific day. The program will keep schedules and records for up to 100 employees. Look for SEW200.ZIP on PC World Online and other online services. Registration fee: $39.50. Guia International Corp., 404/926-6085. **Reader service no. 791**

Tax and Payroll

Am-Tax

Filing tax returns on a business isn't a labor of love—but it is labor. Am-Tax leads you step-by-step through the filing process, taking the sting out of this annual rite of pain and suffering. The shareware version is suitable for personal tax filings, but the forms you need for doing business taxes are only in an extra-cost edition. State tax versions are available separately. The bare-bones personal version is available as AMTAX93.ZIP on PC World Online and other online services. Registration fee: $20 to $150. AM Software Inc., 816/426-8361. **Reader service no. 792**

Zipper Payroll 1.6

Here's a comprehensive and easy-to-use payroll system that comes with a lot of extras, including state tax tables, federal tax tables, and the ability to interface with Quicken. Data entry is intuitive and simply designed. The software automatically loads the proper tax table for your state so you can make the right tax deductions for your employees. Zipper can track your workers' sick time and vacation hours, print payroll checks, handle union dues, manage employees in multiple locations, and allow for separate departments within a company. You'll find ZPACK1&2.ZIP on PC World Online and other online services. Registration fee: $62. SoftCraft, 206/728-8427, 206/337-1842 (fax). **Reader service no. 793**

ZPay 3

You can hire an accountant or service agency to handle your payroll, or you can spend about $70 for a program that will do it for you. ZPay helps you define tax tables (federal, state, and local) and keep tax information on employees. When payday rolls around, simply fill in the hours, salary or commission, and ZPay will calculate withholding and other deductions or bonuses, post the pay period to a ledger for period and wage reports, and print checks and mailing labels. Registered users receive state tax tables on disk. ZPAY3_1.ZIP and ZPAY3_2.ZIP are on PC World Online and other online services. Registration fee: $69.95. ZPay Payroll Systems, 813/866-8233. **Reader service no. 794**

Time Management

Action Management System

When weekly staff meetings veer off course, Action Management System (AMS) can help get you back on track. This program's strength lies in its reporting features, which permit quick monitoring of project status and employee progress. For instance, you can easily find out how often a particular employee meets deadlines. If computers and E-mail are not yet ubiquitous in your office, AMS's paper reports keep everyone informed about projects. AMS410-.EXE is available on PC World Online and other online services. Registration fee: $65. Bill Tucker, 313/676-1327. **Reader service no. 795**

Project/Event Planner 1.1

WINDOWS Full-blown project managers, with Gantt charts and voluminous reports, are fine for specialists. But some folks want to allocate resources and calculate projects without adding another application study-session to their to-do list. This graphical planner lets you plot tasks for a project by dragging the mouse across a grid. Resources—from people to equipment—can be assigned to tasks, with appropriate income and expense amounts attributed to them. Linked tasks come together to calculate the cost and time associated with the project. Even novice planners will be plotting a project after a brief learning curve. APLANR.ZIP is on PC World Online and other online services. Registration fee: $29. Sapphire Software Inc., 808/395-5587; CompuServe, 71223,3653. **Reader service no. 796**

Taskman 4.2

This small and handy DOS project manager offers an easy way to assign and track the tasks, individuals, and resources available and necessary for completing a project. It lacks the sophisticated tools of bigger project managers, such as budget calculations and resource pricing, but it's easy to use and especially well-suited for assigning and tracking staff responsibilities. A pop-up calendar helps in assigning start and completion dates, and integrated online help leads you through the process at each step. You'll find TSKMN4.ZIP on PC World Online and other online services. Registration fee: $35. Bill Moore, 703/949-0115; CompuServe, 71001, 2364. **Reader service no. 797**

Peter Scisco is an independent journalist specializing in technology issues concerning business and education. Lincoln Spector is an associate editor for PC World.

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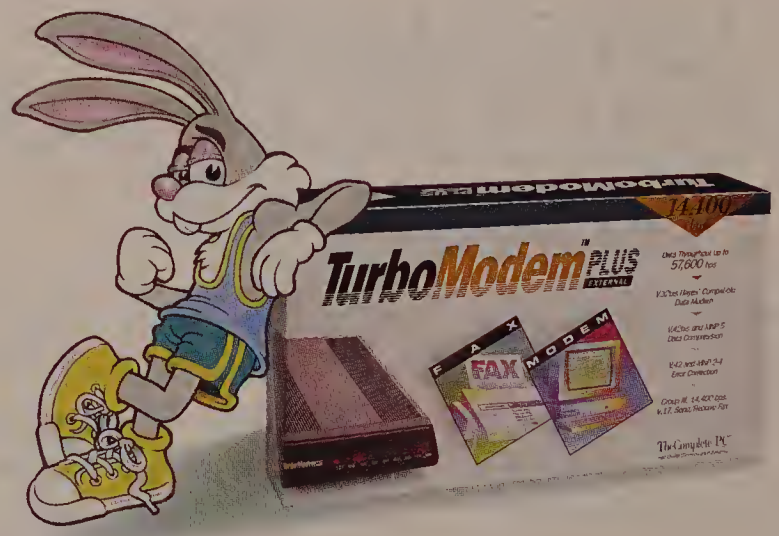

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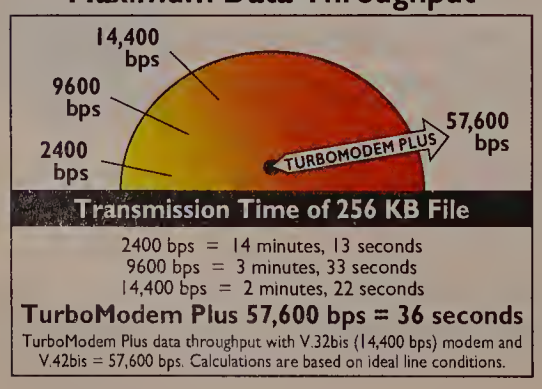

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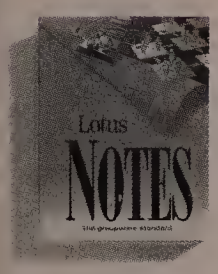

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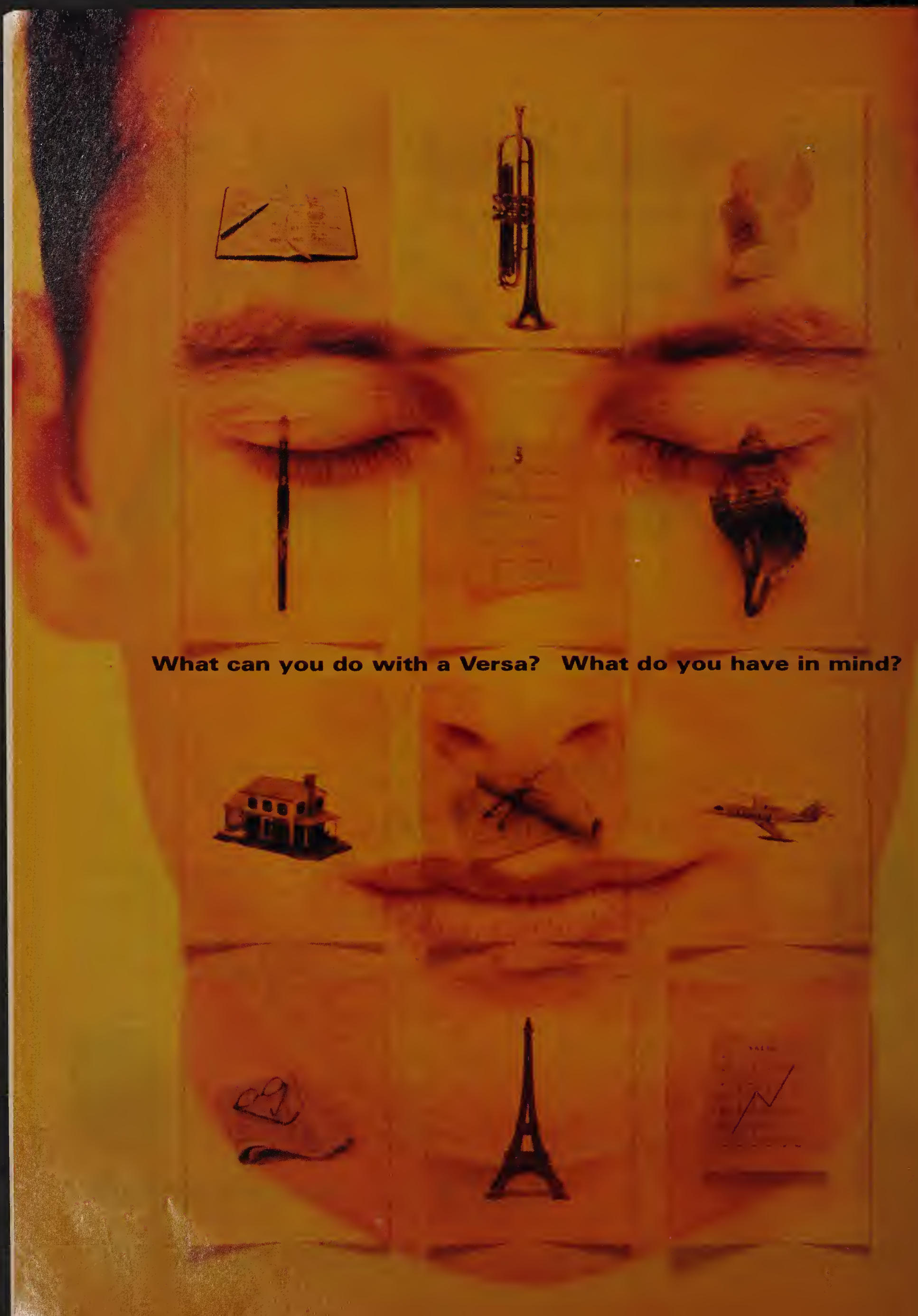

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capabilities, a continent
Edit your report.
away. The artistry of its new,
Work on your
brighter, active-matrix color
presentation.
screen could well inspire you
There are other
to some artistry of your own.
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While its unique, color
things you like to
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technologies. Because in
an unfinished
technology as in life, there's
book. And the
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NEC

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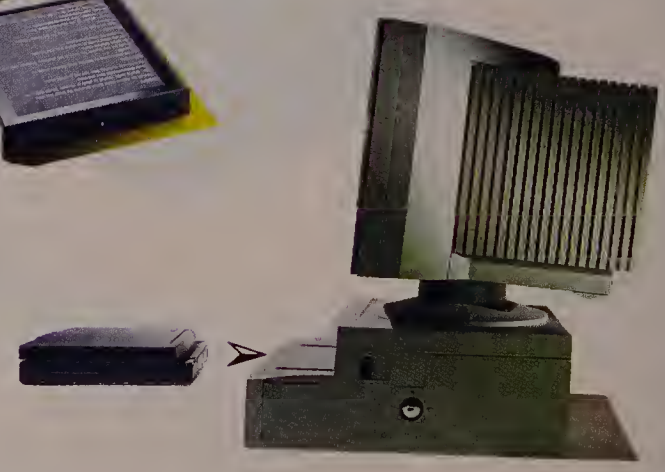

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OCTOBER 1993 BYTE BEST OVERALL DESKTOP REPLACEMENT NOTEBOOK

PC Computing MVP 93 FINALIST

EDITOR'S Home Office COMPUTING PICK

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TAKING THE *PAIN* OUT OF TAXES

You can't avoid death or taxes, and your computer can't help you with death. Can it help make paying your taxes a little easier? Find out from people who've tried it.

JAMES YANG

As April 15 draws fearsomely near, you may be asking if tax preparation software can save you from the annual nightmare of preparing your tax return. Will it be any easier than slaving over the paper forms? Cheaper than an accountant? Will it (please, oh software designer) explain the rules more clearly than the IRS does? Will it make your return less (or more) likely to get audited?

To find the answers to these questions and more we turned to the people most likely to know: users of tax software during the last filing season. We talked to everyone from computer and tax neophytes with simple returns to those whose financial savvy won them a return so complex it would make a CPA flinch. And, since in this case users aren't always experts, we also talked to accountants and to the IRS—the ultimate arbiter when tax time rolls around.

The only thing the users we spoke with had in common (besides bravery) was having prepared their 1992 returns with one of the two top consumer tax packages: ChipSoft's TurboTax and Meca's TaxCut. Besides being the hands-down market leaders, they were the clear winners in last year's review of tax software ("Deep in the Art of Taxes," March 1993) and are on the cutting edge in this category. (For a full list of personal tax packages and their features, see "Do-It-Yourself Taxes").

by Naomi Wise

We, the People

Taxpayers with straightforward returns (without home businesses or complicated investments) were generally delighted with the programs. Mary Jo Wilson, for example, succeeded last year in completing her family's return (and getting a refund) using TurboTax for Windows on her sister's PC. "It saved me quite a bit in preparation costs," says Wilson, who manages her family's finances and describes herself as basically computer-illiterate. "It takes you one step at a time. I used the tax help quite a lot. The more you pursue it, the more you can find bits of information buried in there that you can pull up and use."

The "one step at a time" that Wilson refers to is the in-depth interview that escorts you through your return, offering help, hints, and hand-holding as it relentlessly quizzes you about every aspect of your finances. Your responses—such as your taxable income or earnings on investments—are plugged into the right line on the right form, and the program does all the calculations for you.

But while the 1040/A crowd are generally happy with the software, more complex returns generated more complex reactions—most noticeably from people who understand tax law. "All the programs are bad on depreciation and business expenses, especially employee auto expenses," says retired banker and TurboTax user Leo Perata. The biggest benefit of using tax software, he says, is the ability to import information from your home finance package and to carry over relevant data from your previous year's return. All the packages are constantly improving their help, but Perata says, "The first year, new users have got to go to work to learn the tax laws."

Carl Egis (name disguised upon request) is a CPA who uses a professional tax program at work and has used both TurboTax and TaxCut at home for himself, his kin, and his friends. "Employee business expenses are tricky in all the programs," says Egis. "You always have to override the program's entry for one or another calculation."

Both ChipSoft and Meca claim to have improved their 1994 releases' performance in these problem areas. ChipSoft says it has clarified TurboTax's depreciation questions, expanded its depreciation help, and added a Sep-IRA worksheet (for employer-funded IRA accounts). TaxCut offers IRA percentage calculations, and our review of an early beta version verified that it now automatically takes you to meet your MACRS (Modified Accelerated Cost Recovery System, a depreciation method for tangible depreciable property) with a lucid declining-balance depreciation schedule.

Buying Reassurance

Many tax software veterans say they go to an accountant for help with difficult tax areas or for a final check. "When I'm done using TaxCut, I send the return to my tax adviser for review. The results, without exception, are valid," says Wayne Merriman, an international business consultant whose return includes rental prop-

The Electronic Filing Nightmare

Nashville is a hard, glitzy town—Vegas with a drawl, an Opry, and no slots, where throngs of all-night liquor stores slake the secret thirsts of East Tennessee "dries," and where "working" and "poor" go together like "achy" and "breaky."

Athan Gibbs is a natty dresser who looks a decade younger than his 40-something years. And he knows more about electronically filed tax returns than any other CPA in Nashville. His knowledge didn't save him, though, when he started using ChipSoft's new system for electronic filing last winter. He'd promised his clients they'd get Refund Anticipation Loans (RAL's) three working days after filing their returns, but hundreds of returns seemed to have vanished into electron-land.

And his customers weren't happy about the wait. He and his partner were working well past dark when they heard the front door being shaken violently. Gibbs went to the door, and through the glass he saw the muzzle of a .357 Magnum pointed at his head. "It was a nightmare, a living nightmare," he recalled in September 1993.

That same week in February, small-town Mississippi accountant Catherine Thomas received a telephoned bomb threat and another client threatened to sic a dog on her. She had to have the police escort her to and from her office. In a New Jersey suburb, a bottle-and-stone-throwing mob surrounded the office of CPA Edward Adams. In Warren, Ohio, accountant Janet Krapacs had police remove a client who wouldn't leave her office because he was counting on an RAL to cover the $1000 deposit he'd paid toward a cruise.

"Anybody who would pay $65 to get back $1000 in three days instead of three weeks must need it very badly. The people in my area who file early to get RAL's are mainly laid-off auto workers," says John Barkan, a Detroit-area CPA. "We only had about 50 RAL's rejected out of the 400 we filed, but those people made a scene and threatened my staff." Among the hardships: A woman had to cancel her Las Vegas wedding (losing her deposit in the bargain) and another woman got evicted and slept in her car outside Barkan's office in the middle of winter.

The cause of all the turmoil was ChipSoft's new electronic filing system. In September

erties, capital gains, IRAs, and a small business.

Merriman finds that the software's highly informative tax help adds to his financial savvy. "I use the program because I really want to understand the tax laws so I can minimize my taxes," he says.

Since most tax preparers charge by the hour or the form, users who consult them only for difficult areas still save money.

Robert Durham, general manager of an industrial uniform–rental company in Fayetteville, Georgia, endured an employment-related (and tax-deductible) cross-country move in 1992. "If it wasn't for TurboTax, I'd have been up a creek," he notes. "I wound up in a new city with nobody I knew to turn to who could do my taxes." Since the condo he'd left behind had become a rental unit, he asked his old accountant to create a depreciation schedule for it. "I did the rest myself," he says, "and had my old accountant look at it. He said, 'It's as good as I can do.' I found I was more knowledgeable after doing my taxes myself, and I enjoyed getting it done."

But not everyone would use the word *enjoy*.

"Any program that markets itself as making your taxes almost fun is almost full of it," says Barry Schnur, whose murderously complicated return includes two in-home businesses, as well as employee business expenses. After using TurboTax and then TaxCut, he decided: "For complex returns, both programs will work and both will be painful. But both will be less painful than working without a computer."

After using TurboTax and then TaxCut, Barry Schnur decided: "For complex returns, both programs will work and both will be painful. But both will be less painful than working without a computer."

Professional tax preparers are generally pleased when clients ask them to fine-tune software-drafted returns. Lillian Lea, a Berkeley, California, tax preparer, points out that the programs make her clients gather the necessary information *before* they walk in her door. "I can charge them a lower fee and spend my time thinking of more esoteric approaches than the software can offer."

For people filing 1040/Schedule A returns, the software can replace an accountant entirely. "The software is targeted to this particular segment of the public," says CPA Joanne Berg of San Diego. "In more complex situations, people don't know enough about the tax laws. The tax help on the programs is too simplistic and will often make the wrong decision."

1992, ChipSoft purchased an electronic tax filing company called Speed >S and enthusiastically marketed the service to tax preparers. At the same time, the IRS embarked on an aggressive campaign to sell tax preparers on electronic filing. Between the evangelization efforts of ChipSoft and the IRS, 4700 tax preparers signed up with Speed >S, many times the number ChipSoft expected. And the software, developed in a hurry, had more than its share of problems.

"Prior to sending the software [ChipSoft] said the modules would be integrated—but they weren't," says Marty Stowe of Tax Express in Stamford, Connecticut. "They had rewritten a large part of the electronic filing package's interface to integrate it with TurboTax Pro. When it didn't work, they gave us an older package, and they deleted a lot of error-checking capability because they were getting too many wrong error messages."

"It's like a car manufacturer sending out a car without brakes and saying, 'I'll send you the brakes later,'" says Gibbs.

In one release, mislabeled disks showed an incorrect installation order, so that the program wiped itself out even as it installed. The next day, a new version reached accountants, but by then ChipSoft's help lines were jammed with calls, many of them from desperately confused first-time electronic filers.

Robert Barr, vice president of ChipSoft's Electronic Services Department, tells us, "It's a complex process to do electronic filing and RAL's. There's a subtle distinction that some preparers did not fully understand, between the RAL process and that for direct deposit of refunds." As a result, many preparers called ChipSoft and each one required a lot of time on the phone.

And when the preparers started filing in volume, they found the software couldn't tell them whether a batch of returns had been accepted or rejected—and large batches transmitted from LAN systems *were* rejected. By mid-February, ChipSoft had beefed up its phone capacity and support staff, but the damage had been done.

On July 8, 1993, several tax preparers filed a class action suit against ChipSoft.

"We responded quickly to more volume than we had forecast," Barr explains. "We increased our phone capacity and our support staff. The mislabeled disks were a minor problem. The main problem was the overwhelming volume of users."

The volume was probably affected by the IRS's ambition to have most returns filed electronically. The IRS has announced its goal of receiving all returns electronically by the year 2001. The agency will save money, but the taxpayer will have to pay. Currently, electronic filing fees range from $20 to $75. (Most consumer tax programs allow you to file directly from the software for a small additional fee if you have a modem—or you can send a disk. You don't have to go to a professional.)

"We'll be more than ready for next season," promises Barr. "We contracted with Nelco [an established electronic filing service] for this year. As for Speed >S, we are now looking for an architecture that will support that sort of volume for the next ten years. I have chosen to reengineer the process and really update it."

Will any of the tax preparers caught in the Speed >S trap file through ChipSoft again this year? Athan Gibbs says he probably will. He says he thinks that TurboTax Pro is an outstanding product, and he's confident that one way or another, ChipSoft will get its act together this time.

When Do You Need Help?

Despite improvements to the programs, that opinion isn't likely to change. The software aims to meet the needs of a broad segment of the consumer market. It therefore can't delve into every possible weird financial situation. Nor can it warn of the long-term consequences of legal but unusual deductions. Most tax preparers feel that returns involving self-employment, partnerships, passive losses, rental properties, and depreciation should at least be checked by a professional before filing.

"A traditionally employed person—even someone who earns a few hundred thousand dollars a year as a corporate executive—has almost nothing for the IRS to find," according to Coralie Cross, a CPA in Albany, California. Small-business owners are another story: "With a small business, the IRS can go to town if you can't substantiate all your expenses. Self-employed people need some consultation to identify the tax issues attached to their expenses."

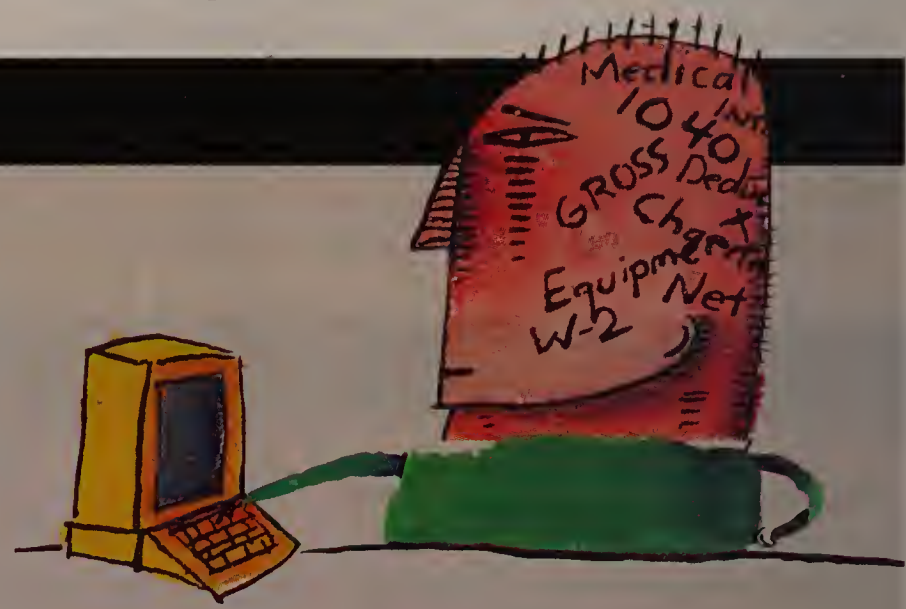
The software aims to meet the needs of a broad segment of the consumer market and can't delve into every financial situation. Nor can it warn of the long-term consequences of legal but unusual deductions.

Empowered Taxpayers

Some users, though, have found the software more accurate than a careless professional. Steve Bulkley, who edits two magazines from his Florida home (and files on the perilous self-employment Schedule C), remembers, "I used to run TaxCut and then go to a tax consultant. A few years ago the consultant transposed some numbers and got me in a bind with the IRS. A program can't transpose numbers, of course, so I stopped using the consultant."

When Bulkley is stumped by a piece of tax law, he calls the IRS help line or gets the relevant IRS publication (free from your local

Do-It-Yourself Taxes



Now that you've decided to trade in your accountant for tax software, what should you look for in a program? The answer depends on how much you know—and care to know—about tax laws and regulations.

Tax software will never completely replace accountants; there's too much room for interpretation with complicated returns. Still, developers are building increasingly sophisticated help into their packages, and the help goes a long way toward demystifying taxes. Several of the programs included in the features comparison on the next page take an interactive approach, conducting on-screen interviews and using the response to select and fill out forms and offer advice. TurboTax and TaxCut were the first packages to offer this feature, but it's now standard. This method can identify deductions and strategies you might not have considered—and may be ideal for those who don't make tax preparation a hobby or a profession.

A few programs still offer a minimalist approach to tax help. Most of them are scaled-down versions of professional tax packages, and they forgo lengthy interviews and advice on how to fill out your return. Instead, they are designed to get you through your taxes as quickly as possible, assuming that you know and understand tax terms and laws and just want to plug in the necessary information and file the form.

The programs also vary in the level and type of tax information they provide. Some include the complete and unabridged works of the IRS. Others provide information on just recent changes in tax law.

Once you've determined what level of tax help you'll need, there are a number of features to consider. One of the most critical is forms. Though all the packages can handle straightforward returns, users with more complicated finances will want to make sure the software supports all the necessary forms, schedules, and worksheets.

Another critical feature is auditing capabilities. Most of the programs in the table will flag potentially problematic deductions and point out omissions that may delay the processing of your return. Some even compare your tax return to national averages to identify differences from the norm that may invite extra scrutiny by the IRS. Other programs show you all the calculations leading up to the final figures on your return.

Though many developers offer packages for preparing state returns, you'll have to pay extra for the pleasure. And none of the packages support modules for every state. TurboTax offers the widest selection, with 45 state packages (though not all of them are available under Windows); TaxBreak and Taxperfect don't offer any. The state modules can be a real time-saver because they automatically transfer relevant information from your federal return.

A package's import capabilities can be particularly important if you've kept diligent records in a money management program. Most of the programs listed here can import data from the most popular personal finance programs, though the ease of the process varies considerably.

Finally, note the hours—and the type—of technical support. Phone support is available for each of the packages, but hours and days of service vary. Keep an eye out for weekend and evening hours, as well as alternative methods of technical support like fax services and bulletin boards. They may be the only way to get through to the company as April 15 approaches.

—Sarah Klein

JAMES YANG

Out-of-the-Box Tax Preparation

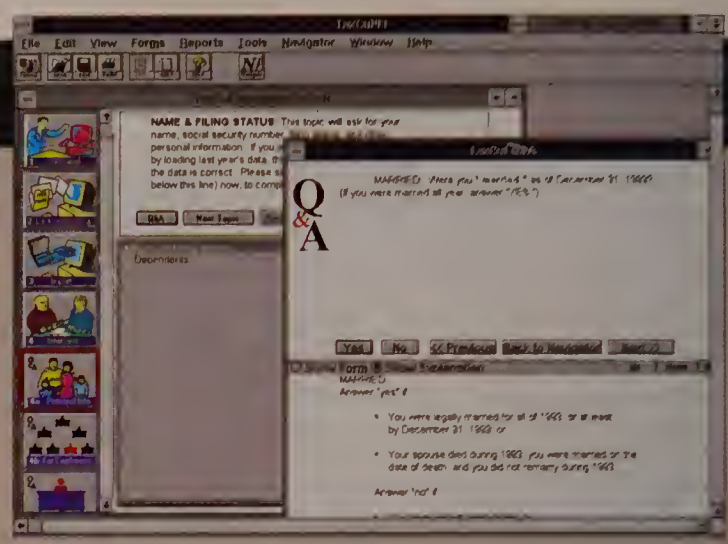
● Yes
○ No
n/a = not available

	AM Software AM-Tax Personal 1040	Meca Andrew Tobias' TaxCut	Computer Associates CA-Simply Tax	Parsons Technology Personal Tax Edge	Digital Frontier TaxBreak	FSMC Taxperfect	HowardSoft Tax Preparer	Intex Solutions Tax Solver[1]	ChipSoft TurboTax
Standard features									
Price	$39	$79.95[2]	$9.95[3]	$19	$29.95	$79.95	$295[4]	$79.95[5]	$69.95
Upgrade price	$29	$29.95	n/a	$16	$19.95	$39.95	$99	$49.95	$29.95
Number of state modules available	24	23	30	42	0	0	1	3	20[6]
Price of state module	$29	$29.95	$19.95	$19	n/a	n/a	$125	$39.95	$39.95
Earliest DOS version supported	2	3.3	3	3	3	3	1.1	n/a	3
Windows or DOS	DOS	Windows[7]	Windows[7]	Windows[7]	DOS	DOS	DOS	Windows[7]	Windows[7]
Number of forms, schedules, and worksheets supported	60	95	92	78	34	85	75	147	100
Tax help									
Interview format	○	●	●	●	○	●	○	○	●
Identifies required forms	●	●	●	●	○	●	○	●	●
Online tax adviser	○	●	●	●	○	○	○	●	●
Online IRS instructions	○	●	●	●	○	●	○	●	●
Tax guide included	○	○	○	○	○	○	●	○	○
Tax planner	●	●	●	●	○	●	●	○	●[8]
What-if analysis	●	●	●	●	○	●	●	●	●
Audit detector	●	●	●	●	○	●	○	●	●
Audit trail printout	●	●	●	●	○	●	○	○	●
Preparation tools									
Calculation override	●	●	●	●	●	●	●	●	●
Automatic recalc after entry	●	●	●	●	●	●	●	●	●
Info link between forms	●	●	●	●	●	●	●	●	●
Ease of use									
On-screen forms	●	●	●	●	●	●	●	●	●
Online software help	●	●	●	●	●	●	●	○	●
Online tutorial	●	●	●	○	○	●	●	○	○
Data import feature	○	●	●	●	●	●	○	●	●
Output									
Prints fileable IRS forms	●	●	●	●	●	●	●	●	●
Electronic filing fee	$19	$14.95	$14.95	$15	○	$5.95	$295[9]	○	$19.95
Support									
Toll-free phone support	○	○	○	○	○	○	○	○	●
Weekday support through April (hours)	10	15	14	17	8	13	9	8	13
Weekend support	○	●	○	○	○	○	○	●	○
Fax	●	●	●	○	●	●	●	●	●
BBS	●	●	●	●	○	○	○	○	●
Contact information									
Vendor phone number	800/ 859-8537	800/ 820-7462	800/ 225-5224	800/ 223-6925	508/ 692-0453	800/ 525-5611	800/ 822-4829	617/ 449-6222	800/ 964-1040
Reader service number	851	852	853	854	855	856	857	858	859

For more information about all products in this table, circle reader service number 906.

[1] Spreadsheet add-on: Windows version requires Excel 3.0 or 4.0 or 1-2-3 for Windows; DOS version requires 1-2-3 2.3 or later.
[2] $39.95 direct.
[3] Shipping and handling charges. $69.99 after April 15.
[4] Combined personal and professional version.
[5] Personal version.
[6] 45 available for DOS version.
[7] DOS version available.
[8] Sold separately.
[9] Unlimited number of returns.

The Promise for 1994

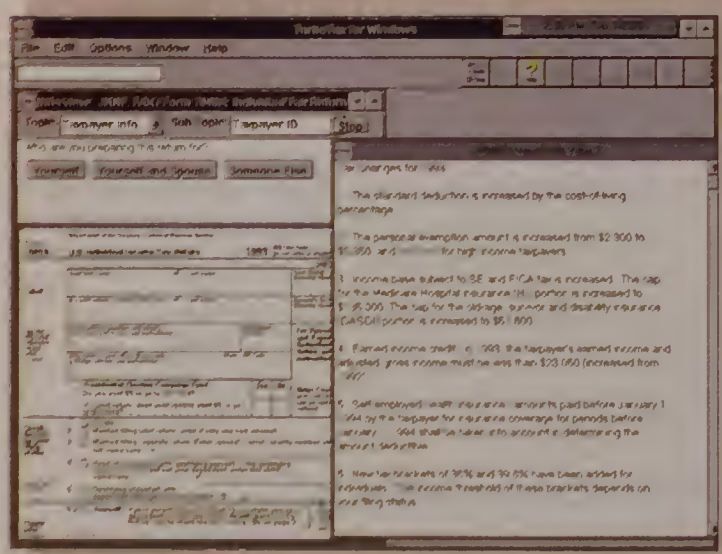


TAXCUT HELPS YOU ANSWER CONFUSING TAX QUESTIONS by explaining what they mean.

Tax software developers haven't just been playing golf in the off-season. Both Meca and ChipSoft promise big improvements this year designed to address some long-standing criticisms of their packages. And a new player in the game—Computer Associates—guarantees to shake up the market with a product giveaway like its phenomenally successful Simply Money campaign.

One of the most critical improvements in both TurboTax and TaxCut is the flexibility to enter information at your own pace and in whatever order you'd like. Though many new users appreciate the hand-holding help that's a hallmark of both programs, several people we spoke with complained that the interview format not only held their hands, it squeezed their fingers in a death-grip. Meca and ChipSoft both promise improvements in this year's software: TaxCut for Windows allows you to rove through the interview at leisure and provides a record of where you've been and what's left to do. TurboTax/Windows has icons to guide you (and to help you back up more easily). ChipSoft representatives say this year's TurboTax lets you switch easily between the interview and the form. Both vendors promise similar improvements in their DOS versions.

Additional changes this year add a host of new features and simplify old ones. According to ChipSoft, TurboTax will boast a new Deduction Finder; one-key printing; a modified tool bar (with icons identified by words, a joy to readers who can't understand the little pictographs); and automated import from Quicken (ChipSoft and Intuit agreed to merge last September). Interview questions are clearer: ChipSoft promises a better route through depreciation and says it has reworded questions that used to sound like "either/or" but really meant "yes/no." You'll be able to fix minor errors *during* the final audit, instead of having to wait for TurboTax to spell out all the 180 mistakes you made. State forms will print out cleanly without requiring special overlays.



TURBOTAX OFFERS IMPROVED TAX ADVICE—including pointers on the new tax laws.

As for Meca's changes to TaxCut, the beta version of the program revealed an enriched, faster interview that lets you skip irrelevant topics. Meca also promises an "Explain This Form" feature. Importing from last year's return and from personal finance programs (especially Managing Your Money) is even cleaner, according to Meca. Imports will appear as on-screen reports that users can easily alter. People who use Managing Your Money as a household budget manager (rather than a tax-item organizer) should find it easier to dump the domestic dirt the IRS doesn't need to know about.

One historic sore point for tax software users is the date the final versions ship. Meca, ChipSoft, and most other vendors release an early version in late October or early November. These versions are fine for preliminary work, but you can't use them to file your return. And the final versions don't ship till much later—sometimes as late as March. Meca and ChipSoft said their final versions would be as timely as possible.

Despite their popularity, both Meca and ChipSoft will have to watch out for the aggressive debut of CA-Simply Tax from Computer Associates (formerly Easy Tax for DOS by SoftKey). Until April 15, Computer Associates is giving the program away for $9.95 (to cover shipping and handling) to anyone who calls 800/737-3382. Though the program was announced too late to review for this issue, Computer Associates director of consumer products David Duplisea says it includes an easy-to-use interview format and alerts you to deadlines appropriate to your tax situation. Meanwhile, TaxCut is fighting back by offering its "early bird" version for just $9.95, too; the cost serves as a credit against the price of the final version.

IRS branch). Fred Ringwold, a resident inspector for the Nuclear Regulatory Commission, also calls the IRS—months before filing season. "The IRS hires temporaries at tax time," he says, "but if you call off-season, you're going to get a career IRS employee who *knows* the answer." Other users who are uncomfortable with IRS language (or staff) confessed to consulting third-party tax books such as *J. K. Lasser's Your Income Tax*, published by Prentice Hall.

How does the IRS feel about software-prepared returns? It seems to love them—or at least to greatly prefer them to error-prone pen-and-ink (or typewriter and calculator) returns. In the heartfelt words of Deputy Assistant Commissioner (Returns Processing) Robert J. Carver, "Software programs can be instrumental in reducing the taxpayer's burden and subsequent taxpayer and IRS errors. Removing the human input factor reduces errors and results in greater processing efficiency."

As for audits, the IRS doesn't know and doesn't care whether you use software or what brand you choose.

Naomi Wise is a San Francisco-based freelance writer. Sarah Klein is an editorial intern for PC World.

Wrist Management.

The PACEMATE™ Features:

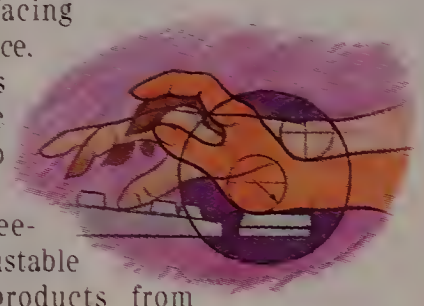
- *Built-in work pace module that monitors keyboard activity*
- *Visual and audible indicators allow user to manage work pace by integrating short breaks*
- *Height adjustable wrist pads for increased comfort*
- *One-year warranty*
- *Key Tronic Quality*
- *Manufacturer's suggested list price $79.*

The TRAKMATE™ Features:

- *Trackball integrated into the wrist pad's design*
- *Two extra buttons with corresponding LEDs for trackball speed control and drag lock*
- *Height adjustable wrist pad for increased comfort*
- *One-year warranty*
- *Key Tronic Quality*
- *Manufacturer's suggested list price $99. (PS/2 requires cable kit)*

Key Tronic offers workplace solutions that add productivity and comfort.

Helping workers do more with greater comfort is one of the big challenges facing today's workplace. And products from Key Tronic are designed to do just that.



The free-standing adjustable wrist pad products from Key Tronic offer users a comfortable resting surface for wrists and palms. The TRAKMATE™ wrist pad features a powerful trackball unit for quick, easy access to point and click functions. The PACEMATE™ wrist pad features an integrated work pace module that monitors keyboard activity, work periods and rest times.

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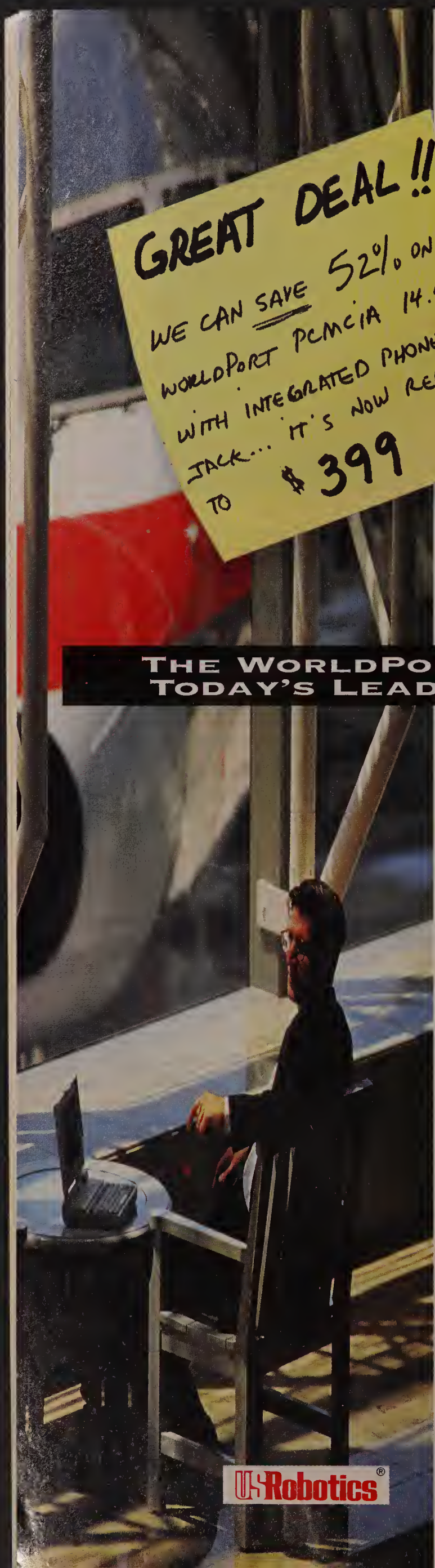
Circle 223 on reader service card



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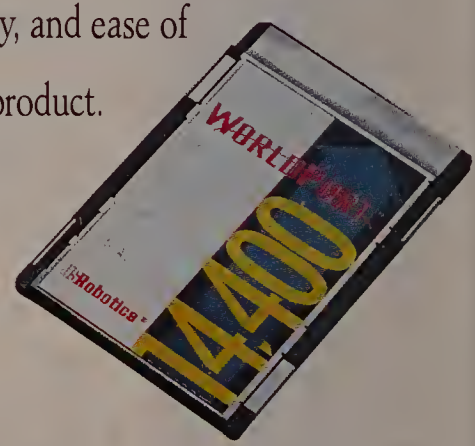

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Circle 154 on reader service card

A HOUSE OF CARDS?

Taking the Guesswork Out of PCMCIA

WE TESTED 10 NOTEBOOKS AND 18 PCMCIA CARDS. HERE'S A GUIDE TO WHICH OF THESE CREDIT-CARD–SIZE PERIPHERALS WORK IN WHICH NOTEBOOKS—AND WHICH DON'T.

BY GENE SMARTE

If you're considering buying a notebook computer, you've no doubt grappled with the tongue-twisting acronym PCMCIA. Billed as the solution to the limited expandability of mobile computers, PCMCIA defines the standards for credit-card–size memory, hard disk, modem, and other I/O devices. In theory, you can effortlessly swap cards in and out of your notebook, changing functions and features in an instant, thanks to PCMCIA's plug-and-play capability.

The result should be increased versatility in mobile computers. Unfortunately, our compatibility tests, using 10 notebooks and 18 representative PC Cards, found PCMCIA falling somewhat short of the versatility and ease of use expected in a standard. All the notebooks experienced trouble with one or more PCMCIA cards, and often the failure rate was much higher: Not a single card we tested worked in all systems. We also found that not all E-mail applications would run with the fax-modem cards, with the exception of Lotus Development Corporation's cc:Mail.

Our findings were echoed by frustrated mobile computer users who found that the promise of PCMCIA belied the reality of making it work. Take the experience of Mel Snyder, president of ProClinica, a New York–based marketing consulting firm for the pharmaceutical and health care industries. "PCMCIA cards are wonderful, but [using one] is not as simple as [just] plugging it in and making it work."

Last year he bought a Toshiba T4600 notebook, which has one Type II slot and one nonstandard 16mm Type IV slot. First he installed a Xircom CreditCard Ethernet Adapter in the Type II slot, saving the Type III slot for a future hard drive. The Toshiba couldn't find the adapter. A call to Xircom tech support uncovered the solution: He had to put the LAN adapter in the Type III slot. He also had to modify his EMM386.EXE file. That done, the LAN adapter was soon in working order—until he installed new LAN drivers from Toshiba and it failed again. He went back to the original drivers.

Though Snyder's Megahertz 14.4-kilobit-per-second PCMCIA Data/Fax Modem worked fine, his system locked up when it entered resume mode. It took a second Toshiba driver that supports resume mode to solve the problem. Finally, Snyder had to try four memory cards from three vendors before finding one, from Toshiba, that would work with his Toshiba notebook. Advises Snyder: "Know thy vendor, thy dealer, and their technical support phone numbers, because you'll be using them."

Real-World Testing

Is PCMCIA compatibility good enough for you? Unfortunately, you have to judge compatibility on a notebook-by-notebook, card-by-card basis. The two critical ingredients of success: the condition and variety of your notebook drivers and BIOS software.

We tested cards in four popular categories: fax-modems, storage, ethernet adapters, and SCSI. Our success rate is based on the number of times the 18 PC Cards were able to complete a set of tasks. The most popular cards—fax-modems—performed the best.

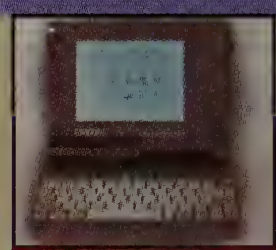
Fax-Modems

In general, fax-modems were among the most compatible cards. We had almost a 66 percent success rate installing and using fax-modem cards. Some combinations failed for a simple reason: The systems either didn't have the right slots to accommodate the PC Card or their design prohibited use of the

PHOTOGRAPHY BY GILES HANCOCK

Compatibility Conundrum: PCMCIA Cards Don't Always Work

n/a = not applicable



	AT&T EO 440	AST PowerExec 4/33SL	Compaq Concerto	Epson ActionNote 4000
CPU	Hobbit	486SL-33	486DX-33	486SLC-33
Installed RAM (MB)	8	4	4	4
Hard disk size (MB)	20	205	250	80
PCMCIA driver set	proprietary	Phoenix 1.04	SystemSoft 2.01	Databook 2.20
Fax-Modem				
AT&T Paradyne KeepInTouch Card				
cc:Mail Remote/WinFax	n/a	pass/pass	pass/pass	pass/pass
Compaq PCMCIA 14.4 Data + Fax Modem				
cc:Mail Remote/WinFax	n/a	pass/pass	pass/pass	pass/pass
Epson Fax/Modem Card EFM 144				
cc:Mail Remote/WinFax	n/a	pass/pass[1]	pass/pass	pass/pass
Intel PCMCIA Faxmodem 14.4/14.4				
cc:Mail Remote/WinFax	n/a	fail/fail	pass/pass	pass/pass
Intel PCMCIA Faxmodem 96/96				
cc:Mail Remote/WinFax	n/a	fail/fail	pass/pass	pass/pass
Megahertz PCMCIA Data/Fax Modem with XJack				
cc:Mail Remote/WinFax	n/a	pass/pass	pass/pass	pass/pass
Toshiba Noteworthy 2400/9600 Data/Fax Modem				
cc:Mail Remote/WinFax	n/a	fail/fail	fail/fail	fail/fail
Storage				
Boca Seadisk	pass	fail	pass	pass
Epson 2MB RAM Card	pass	fail	pass	pass
Fujitsu 1MB Flash Card	fail	fail	fail	fail
Fujitsu Low Power SRAM	pass	fail	fail	pass
Integral PocketFile 85	fail	fail	fail	fail
SunDisk SDP5 Series	pass	fail	pass	pass
Toshiba 2MB SRAM	pass	fail	pass	pass
Ethernet				
AST PCMCIA Ethernet LAN Adapter 10BT	n/a	fail	fail	fail
Socket EA Plus Ethernet Adapter	n/a	fail	fail	fail
Xircom CreditCard Ethernet Adapter	n/a	fail	pass	fail
SCSI				
New Media Visual Media SCSI	fail	fail	pass	fail

[1] WinFax phonebook wouldn't work properly.

[2] The patented XJack prevented use of the card.

cards. For instance, Megahertz's otherwise thoughtfully designed X-Jack retractable phone jack couldn't be used properly in the Zenith's Z-Lite notebook because there wasn't room to insert a phone plug into the card's extended RJ-11 jack. The Epson Fax/Modem PC Card had the highest success rate with all the mobile systems that were tested, followed by the Compaq and AT&T PC Cards. The AT&T EO 440, an innovative notebook that runs the PenPoint operating system, includes its own fax-modem, which we were unable to disconnect in order to use a PCMCIA card.

Storage

For storage—mostly solid-state, with one rotating hard drive—we had about a 50 percent success rate. The SunDisk SDP5 Series running in the Toshiba T4600C took 28 seconds to complete our test, making it the fastest drive in our benchmarks. The slowest: the Epson 2MB RAM Card running in the Toshiba Satellite T1950CS. Our only test of rotating storage, Integral's PocketFile 85, failed largely because it required a Type III slot, which only the Toshiba notebooks provide. The Toshiba T4600C eagerly formatted the disk when using vendor-supplied drivers (it wouldn't work without them), but the drive still refused to work in the T1950CS.

The problems we encountered should be overcome thanks to the recent introduction of the PCMCIA ATA (the mobile equivalent of IDE) standard for hard drives. For now, however, the SunDisk storage card offers the best bet for compatibility.

Ethernet Adapters

We had barely a 10 percent success rate with the three ethernet adapters we tested, due in part to our requirement that the

Gateway 2000 ColorBook	NEC UltraLite Versa	Toshiba Satellite T1950CS	Toshiba T4600C	Twinhead SubNote 486SLC	Zenith Z-Lite 425L
486SX-25	486DX-33	486DX2-40	486SL-33	486SLC-33	486SX-25
4	4	4	4	8	4
123	157	127	120	123	85
SystemSoft 2.0	SystemSoft 1.04	Phoenix 1.0	Phoenix 2.0	DataBook CardTalk 2.20.9	Ventura Micro 1.00
fail/fail	pass/pass	pass/pass	pass/pass	pass/fail	pass/fail
fail/fail	pass/pass	pass/pass	pass/pass	pass/fail	pass/fail
fail/fail	pass/pass	pass/pass	pass/pass	pass/fail	pass/pass
pass/fail	pass/pass	fail/fail	pass/pass	pass/fail	pass/fail
fail/fail	pass/pass	fail/fail	pass/pass	pass/fail	pass/fail
fail/fail	pass/pass	pass/pass	pass/pass	pass/fail	fail/fail[2]
pass/fail	pass/pass	pass/pass	pass/pass	fail/fail	fail/fail
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PCMCIA CARD TEST METHODOLOGY

Each notebook was loaded with the PCMCIA drivers included in the system. The exception is the Gateway, which used the Phoenix PCMCIA drivers found in PC-DOS 6.1. All drivers conformed to the PCMCIA 2.01 specifications.

• The fax-modems were tested with three applications: Lotus cc:Mail Remote 3.40, Delrina WinFax Lite 1, and America Online for Windows 1.0. To pass each test, the modem had to establish a link with the remote modem and exchange data.

• Storage cards were tested using the drivers supplied with the notebooks, except for the PocketFile 85 hard disk, which came with its own. First, the disk had to accept a DOS format; then it had to run a disk benchmark that wrote and read 2000 files. In the case of the AT&T EO 440, which runs the PenPoint operating system, we simply determined whether data was moving between the PC Card and system memory.

• The ethernet cards were tested using Windows for Workgroups 3.1. The installed drivers were supplied by the card vendors. To pass the test, the ethernet card had to establish a link with other Windows for Workgroups nodes via 10Base2 Thinnet cable and successfully exchange files.

• The SCSI controller was tested using the software supplied with Corel SCSI. To pass the test, the SCSI controller had to be recognized by the Corel SCSI software.

It's a sm

PCMCIA Adapters (adapters for devices with PCMCIA Type II slots)

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ThinkPad 350C (486SL/25 MHz processor, 1 PCMCIA slot)

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cards establish a link with Windows for Workgroups 3.1. For instance, we couldn't get AST's PCMCIA Ethernet LAN Adapter 10BT card, which doesn't support Windows for Workgroups, to work on any system. However, the card does support IBM Ethernet and IBM's LAN Support Program. The two other LAN adapters we tested worked with Gateway's ColorBook, making the notebook a good choice for LAN users using Windows for Workgroups.

SCSI

SCSI adapter cards represent some of the latest technology in the PCMCIA form factor. Unfortunately, we could get the Visual Media SCSI card to work in only three of our ten systems.

And the Winner Is...

It's a shame that there isn't a clear winner across all categories. One system may work well with modems but fails terribly in storage. Another works with SCSI but falters elsewhere. The Compaq Concerto and Toshiba Satellite T1950CS seem to provide the most compatible PCMCIA solution. Both systems, as well as the NEC and Epson, delivered a 70 percent or better overall success rate.

Driver Software Is Key

We found that the real crux of compatibility is the software provided by your notebook vendor, whether it's Card and Socket Services software, usually included in the system's BIOS, or the set of drivers included for specific types of PC Cards.

These services work with PC Card drivers that act as software interfaces between the cards and your notebook.

What's to Be Done?

The compatibility crisis has forced nearly every PCMCIA card maker and notebook vendor to do its own testing. Toshiba has tested over 50 PC Cards from about 25 companies, and Compaq has had about 40 card vendors test more than 140 cards with its Concerto.

The PCMCIA standard continues to mature. It took a big step forward last fall when Microsoft agreed to implement SystemSoft's drivers in future versions of its operating systems. Notebook vendors need to include all the software drivers for the PCMCIA products, or at least inform their buyers that they need them. If an industry-wide, standardized testing program could be established, that too would help standardize PC Card products.

The best guide to compatibility is the notebook manufacturers' PCMCIA approved list. We found that the success rate rises when you use only cards recommended by a notebook's manufacturer.

For the moment, however, there's only one way to ensure that your mobile system and its PC Cards will work together: Don't buy your new system and cards until your dealer can demonstrate that they really work together.

Gene Smarte is a PC World *contributing editor based in Riverside, California.*

A PCMCIA PRIMER

In 1989 the PCMCIA (Personal Computer Memory Card International Association) was formed to solidify hardware standards and software interface requirements for removable memory cards and their receptacles. In the beginning, the PCMCIA and its specifications dealt only with memory-related removable cards. The evolving standard now includes definitions for the products (PC Cards) and slots.

There are currently three PC Card formats: Types I, II, and III. (PCMCIA maintains that there is no Type IV card under consideration at this time.) All three formats measure 54mm (2.13 inches) by 85.6mm (3.37 inches). Type I cards are 3.3mm thick; Type II cards are 5mm thick; and Type III cards are 10.5mm thick. Any card will fit into its own type slot or a larger type slot.

The PCMCIA standard also specifies connector configurations so that you can plug and unplug the cards in an active, or hot, slot.

To make the software interface independent of hardware, there are specification extensions that define a hierarchy of software functions. At the highest level is Card Services. Tasks running on the system make calls to Card Services, which manages the interaction among multiple applications running on a host and the PCMCIA cards and their resources. Card Services makes calls to the hardware-dependent Socket Services to access card functions.

Socket Services talks to the PCMCIA card, managing single or multiple PCMCIA card installations, controlling card configurations, and identifying card resources, memory addresses, and data organization. These operations are transparent to users.

A PCMCIA GLOSSARY

- **CARD SERVICES**—A software layer that manages the PC Cards, slots, and system resources available for the cards.
- **CIS (CARD INFORMATION STRUCTURE)**—A PCMCIA-specified data structure on every card that describes the formatting and data organization on the card.
- **CONFIGURATION**—Initializing or altering the PC Card's configuration registers in order to match the card's capabilities to the those of the host.
- **FLASH MEMORY**—A type of erasable, nonvolatile memory often used as an alternative to rotating (hard disk) storage.
- **HOT SWAPS, QUICK SWAPS**—The capability to plug in and unplug PCMCIA cards without shutting off system power.
- **PC CARD**—Any memory or I/O peripheral card that complies with established PCMCIA standards.
- **PCMCIA**—The Personal Computer Memory Card International Association, a nonprofit trade and standards association that establishes and maintains the PCMCIA specifications.
- **PLUG AND PLAY**—The capability to swap any PCMCIA card with another and have it work without rebooting the system.
- **SOCKET SERVICES**—The standardized software connection between PCMCIA cards and applications software; manages recognition and use of PC Cards.

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PC MAGAZINE "Scoring high in overall value and design, the Micro Electronics WinBook gives you a lot for your money, including an outstanding integral trackball."

PC MAGAZINE, Guide to Portable Computing, 8/93

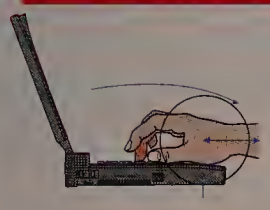
COMPUTER SHOPPER "If you're a Windows user on a budget, or just have a bad case of Mac envy...you should take a look at the WinBook. It's a machine that can hold its own with more expensive, less thoughtfully designed systems from other direct vendors."

COMPUTER SHOPPER, This Powerbook Twin Acts Like a PC, 9/93

WINDOWS MAGAZINE "The WinBook is a great example of what a Windows notebook should be....fast, easy-to-use and a miser on battery life....It's also inexpensive: nearly 50% less than some comparable notebooks."

WINDOWS MAGAZINE, Transcontinental Portable, 9/93

The New WinBook Intel486 SX and DX SL Enhanced Features

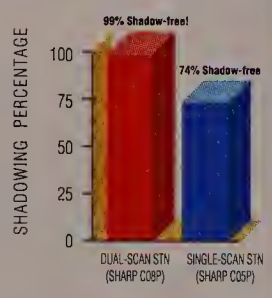


Ergonomically engineered & designed by award-winning Palo Alto Design

The WinBook's unique ergonomic features include a sloping wrist rest and keyboard with full-size keys, plus a centered, dual-button trackball—allowing you to work in total comfort away from your desk.

Clear, sharp color display gives you near-active matrix quality at a passive matrix price!

Images are sharper and clearer with less cursor loss. And the WinBook's advanced dual-scan color display gives you 99% shadow-free performance compared to other single-scan passive matrix displays. You get a brighter, crisper, wider angle of view with an 18:1 contrast ratio—compared to 13:1 with previous passive matrix technology.



Longer battery life

The WinBook features NiMH 2200 MA batteries with gold-plated contacts, allowing it to run much longer than units with traditional NiCAD batteries—and there's no memory effect!

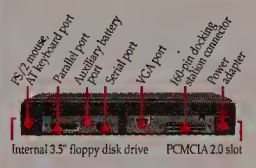
The WinBook offers you more features for less!

- 9600 baud send/4800 baud receive fax/2400 baud modem
- Industry-standard PCMCIA 2.0 slot
- 512k video RAM
- Fast-acting LCD screen
- Built-in centered dual-button trackball

Docking station gives you desktop power!

Two expansion slots and drive bays let you add peripherals such as monitors, hard drives, CD ROMs, I/O cards or an extended keyboard. Includes parallel, serial, PS/2 mouse, external keyboard and VGA ports. **And it's just $399!**

Mouse/keyboard, parallel, serial and VGA ports plus PCMCIA expansion



PC MAGAZINE Editor's Choice Awards

First Runner-Up

68 units reviewed! Portable Computing Issue, August '93

intel inside

Upgradable processor!

WinBook™

Micro Electronics
a division of MEI/Micro Center, Inc.

Monochrome	Color Dual-Scan
$1599	**$1999**
4MB RAM/200MB HDD	4MB RAM/200MB HDD

- SL Enhanced Intel 486SX 25MHz
- Fax modem included!
- DOS and Windows

Call for the lowest DX prices!

Convenient payment options

Use your MasterCard, VISA, Discover Card, Micro Center charge, personal check or P.O. with credit approval.

Thank-you for your order!

Service, warranty, support

- 72-hour service turnaround guarantee.
- 30-day unconditional money-back guarantee.
- 24-hour burn-in protection.
- One-year limited warranty on parts and labor.
- Toll-free technical support for the life of the computer.

30-day unconditional money-back guarantee

Your satisfaction is unconditionally guaranteed for 30 days from date of purchase. If for any reason you are not satisfied with your purchase from us, we want you to return it. We will be glad to repair the product or give you your money back.

SX & DX Specifications

Size/Weight
- 11" x 8 3/4" x 1 3/4"
- SX monochrome: 5.4 lbs. with battery
- SX and DX dual-scan color: 5.9 lbs with battery

Pointing Device
- 16mm Alps dual-action, Microsoft-compatible trackball

Battery
- SX: up to 3 hours with power management, over 5 hours with auxiliary power system (less 30 minutes for color)
- DX: over 2 hours with power management, up to 5 hours with auxiliary power system

Processor and Memory
- SL enhanced Intel486 SX 25MHz or DX 33MHz CPU
- 4MB RAM (upgradable to 32MB)
- Pico Power Evergreen HV chipset
- 8k internal cache

Drives
- One built-in 1.44MB 3.5" floppy drive
- Internal 200MB (16ms) hard drive

Software
- Comes loaded with MS-DOS 6.2 and Microsoft Windows 3.1

Display
- SX monochrome: super-twisted 64 gray-scale 10" LCD and 1024 x 768 for external monitor
- SX and DX color: dual-scan STN color display 9.5" LCD and 1024 x 768 for external monitor
- 512k video RAM
- Adjustable contrast and brightness
- Visible LED indicator on cover-down

Keyboard
- Full-function keyboard with 85 keys and 4 inverted-T cursor control keys, 3.0mm keyboard spacing

Modem
- Fax-9600 baud send/4800 baud receive/2400 baud modem

I/O Ports
- PS/2 mouse interface/AT keyboard interface
- PCMCIA 2.0 slot
- Serial: 9-pin connector
- Parallel port
- Video: 15-pin connector for CRT
- 160-pin docking station
- Auxiliary battery port

Options
- Docking station
- Car adapter

Hurry! Order today! Call 1-800-468-0420

Monday-Friday, 8am-9pm EST • Saturday, 9am-4pm
1160 Steelwood Rd., Columbus, OH 43212 • FAX: 1-800-448-0308

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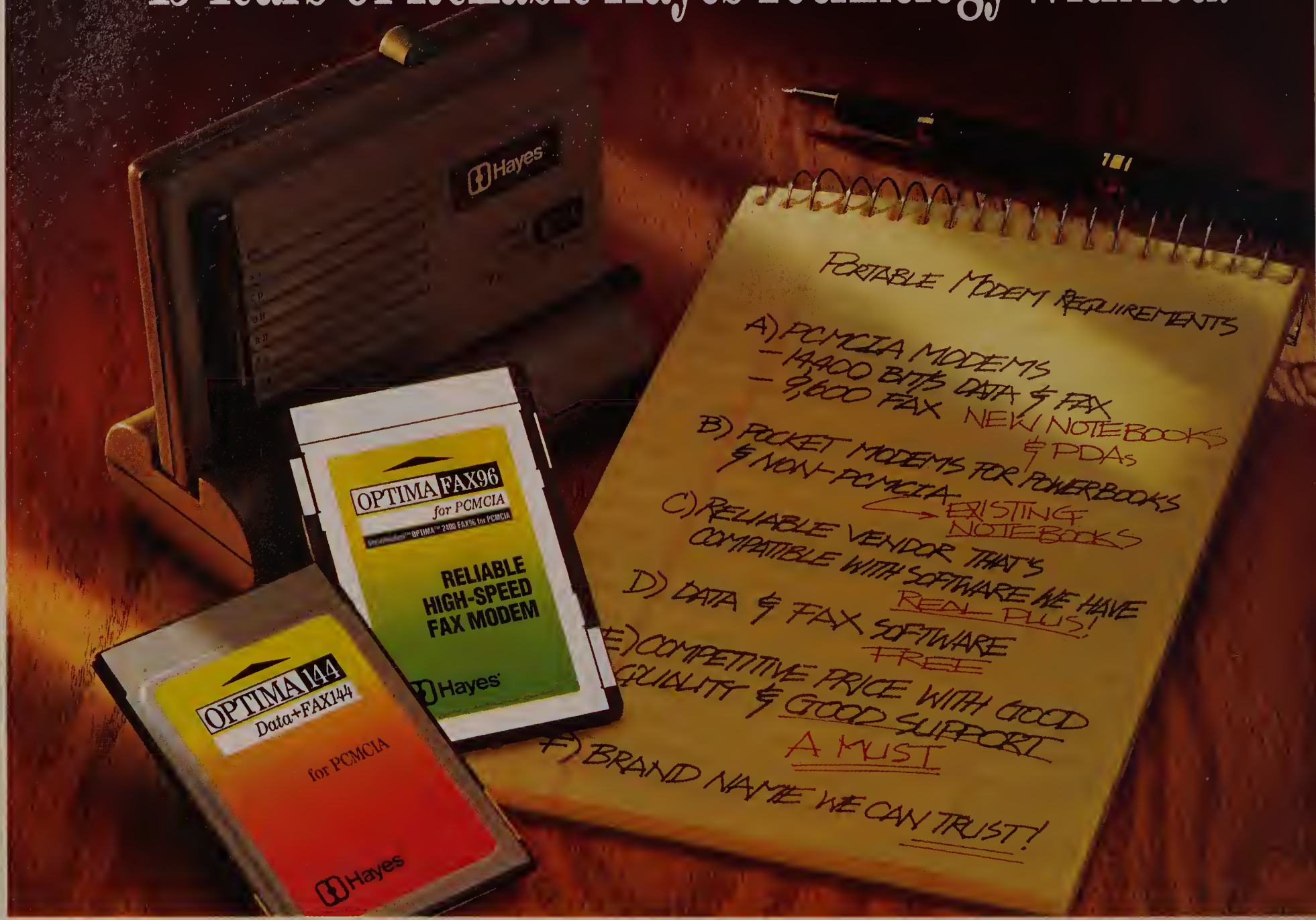
Circle 197 on reader service card

No Matter What Kind Of Notebook You Have, Take 15 Years Of Reliable Hayes Technology With You.



Hayes Introduces Multi-Platform Solutions For Mobile Computing.

OPTIMA 144 DATA + FAX144 for PCMCIA	$399 OPTIMA 144 + FAX144 Pocket Edition	OPTIMA FAX96 for PCMCIA
$399		$299

For fifteen years Hayes has been providing reliable modems for desktop communications. Now you can take that same confidence on the road. Introducing Hayes® OPTIMA™ Mobile Communications products.

Hayes OPTIMA 144 Data + FAX144 and OPTIMA FAX96 modems for PCMCIA provide dependable performance for notebooks or PDAs with PCMCIA Type II slots and above. For remote applications as well as convenient desktop use with PCs and Macs™, there's the stylish Hayes OPTIMA 144 + FAX144 Pocket Edition®. If you're looking for economical, portable FAX capability, choose the Hayes OPTIMA FAX96 for PCMCIA. It comes with a 2,400 bit/s data modem, low power consumption ideal for PDAs, and a great low price. And all OPTIMAs have Hayes® AutoSync for synchronous transmissions without an adapter card.

To get you communicating fast, easy, and FREE, our PCMCIA modems come with Smartcom™ for Windows™ LE communications software, and Windows Fax software. The OPTIMA Pocket Edition comes with Smartcom II® and Smartcom™ FAX for the Mac™, or full-featured Smartcom for Windows and Windows FAX software for PCs.

For more information on our mobile computing solutions for almost any need, call **800-96-HAYES**, or call our FAX back service *Hayes FAX Response* at **800-HAYES-FX** and request Document 144. In Canada, call **800-665-1259**.

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Circle 105 on reader service card

Though engineers continue to shrink portable computers even as they include more features and power, they have yet to find a way to fill them with all the goodies we need. If you're like us, you often find yourself weighed down with bulky options such as modems, LAN cards, and floppy drives—unless your notebook has a PCMCIA slot.

PCMCIA is an awkward acronym for the latest technology in mobile computing. PCMCIA does *not* stand for People Can't Memorize Computer Industry Acronyms. PCMCIA *does* stand for Personal Computer Memory Card International Association. This is a 575-member international industry group responsible for creating the hardware and software specifications for these palm-size memory and peripheral add-in cards, commonly known as PC Cards. The specifications define devices that do everything

PCMCIA:

The Peripatetic Peripheral

OR, A SHOPPER'S GUIDE TO COMPUTING FULFILLMENT THROUGH LIGHTWEIGHT, PLUG-AND-PLAY EXPANSION CARDS FOR MOBILE COMPUTERS.

we've come to expect from add-in cards and peripherals.

While a typical PC Card has the footprint of a credit card, it is somewhat thicker: 3.3mm, 5mm, or 10.5mm, depending on whether it is a Type I, Type II, or Type III card, respectively. Memory cards are generally Type I, modems Type II, and hard drives Type III. Additionally, you may see some manufacturers' products claiming Type IV designations. Type IV, at 16mm, is a JEIDA (Japan Electronic Industry Development Association) standard. At this time, the Type IV is neither included in PCMCIA specifications nor officially under consideration. For more information about the PCMCIA and its specifications, check out "A PCMCIA Primer."

Current PC Cards include ones for solid-state memory (flash, static RAM, ROM, DRAM, and more), rotating mass storage, communications (data and fax-modems), and LAN adapters (ethernet and token ring). A fifth category we call New Technologies includes SCSI, serial, wireless, and—the latest entrants on the stage—sound adapters.

While a small footprint and light weight are positive attributes in any mobile device, power consumption and durability are also important considerations, and PC Cards pass this test as well. PC Cards often can be powered down when not in use and draw as little as one-tenth of a watt or less. While most flash memory cards are 12-volt devices, a new generation of 5-volt chips is reaching the market, and they should dramatically reduce power consumption.

PC Cards are also extremely rugged. Drop a PC Card on a concrete floor, and it will suffer little or no damage; some PC Card hard disks even have operational shock ratings in the hundreds of g's. Most desktop hard drives, however, can withstand no more than a 100g shock.

There's a price for all these great features, however: Expect to pay up to three times as much for a PCMCIA card as you would for a similar AT card, and the cost per megabyte of memory can be up to ten times more than the desktop equivalent. However, while you might need separate hard disks and modems for your home, mobile, and office PCs, with the addition of a PC Card you can swap peripherals, data, even operating environments.

THE PROMISE: PLUG AND PLAY

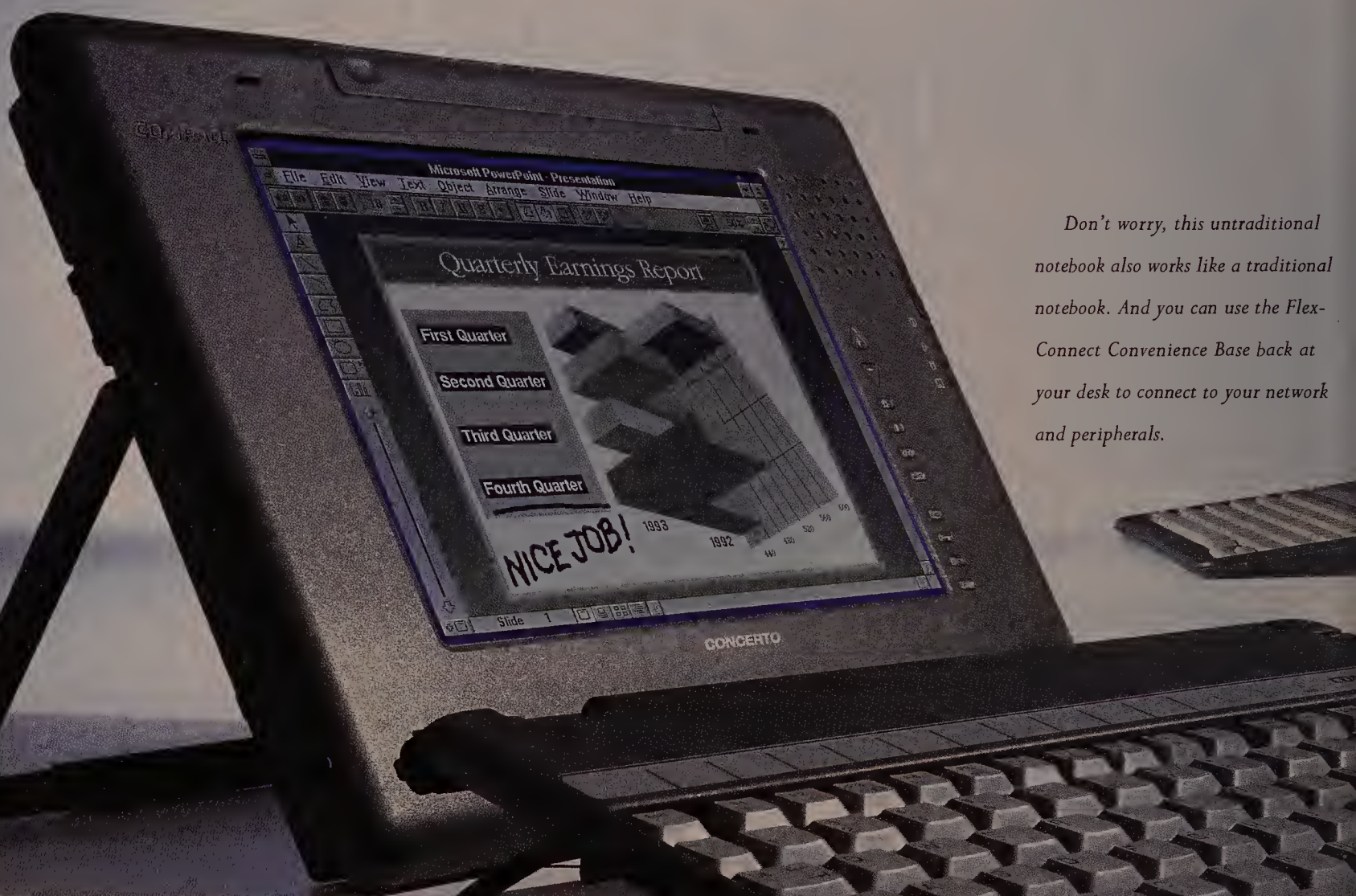
Unfortunately, you can't always insert PC Cards from different manufacturers into system card slots that conform to the PCMCIA standard. Try swapping PC Cards among notebooks, and you're likely to find that this plug-and-play concept is more like slug-and-play. Though PCMCIA does define the physical, electrical, and software specifications for the technology, the software requirements are subject to interpretation by notebook vendors. The result: Most PC Cards aren't compatible with all notebooks.

BY GENE SMARTE

PHOTOGRAPHY BY GILES HANCOCK

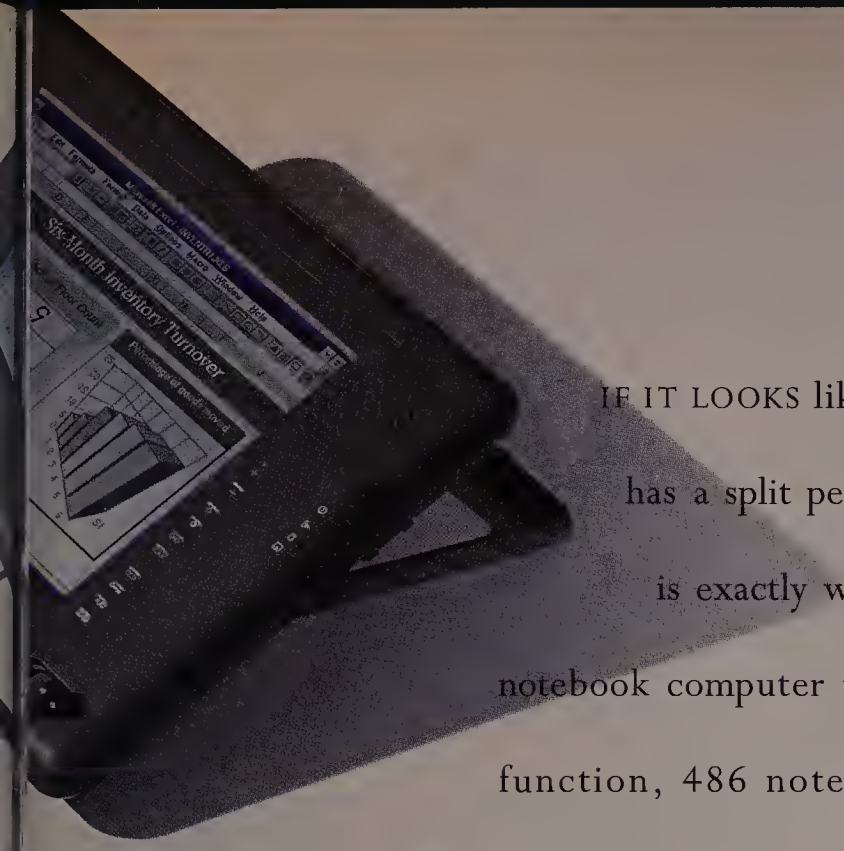
Imagine a notebook that adjusts to the way you work instead of the other way around. The keyboard detaches when that's more convenient. You can use the pen as a pointing device, to highlight or delete text, or to take notes (you know, like a pen). And unlike "convertible" notebooks, you can comfortably use both the keyboard and pen at the same time.

INTRODUCING A TRADIT
COMPLETE DISREGA

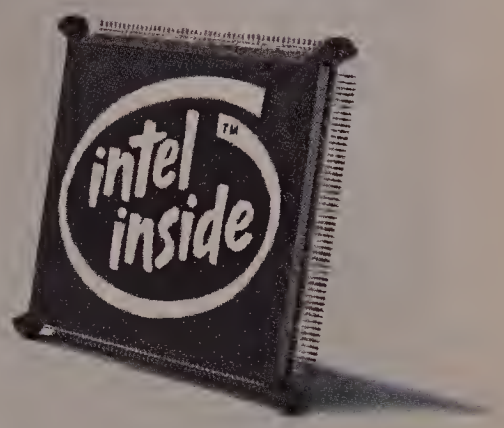


Don't worry, this untraditional notebook also works like a traditional notebook. And you can use the Flex-Connect Convenience Base back at your desk to connect to your network and peripherals.

Concerto is available in a 486/25 [illegible] 486/33 model, weighs only 6.5 l[illegible] without keyboard), includes a diskette [illegible] instant-on capabilities, and has an average batt[illegible] 3.5-4 hours. MS-DOS 6.0, Windows for Pen Computing, Ink's InkWareNoteTaker, an[illegible] Slate PenPower for Microsoft Excel are included. As well as our 3-year worldwide warranty.

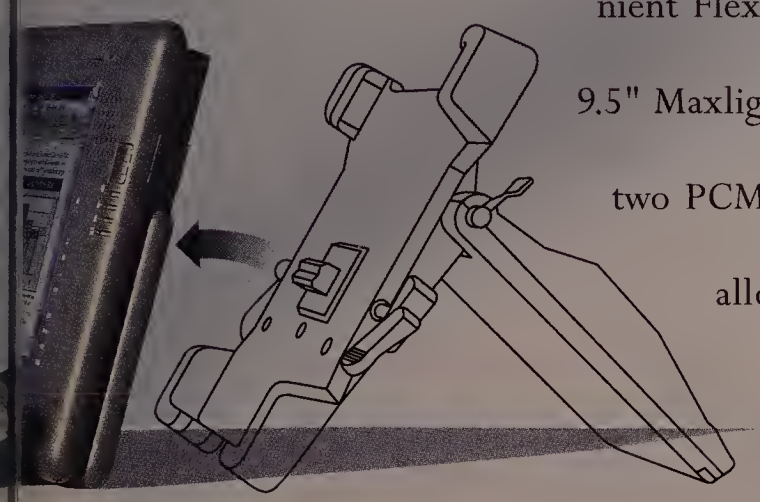


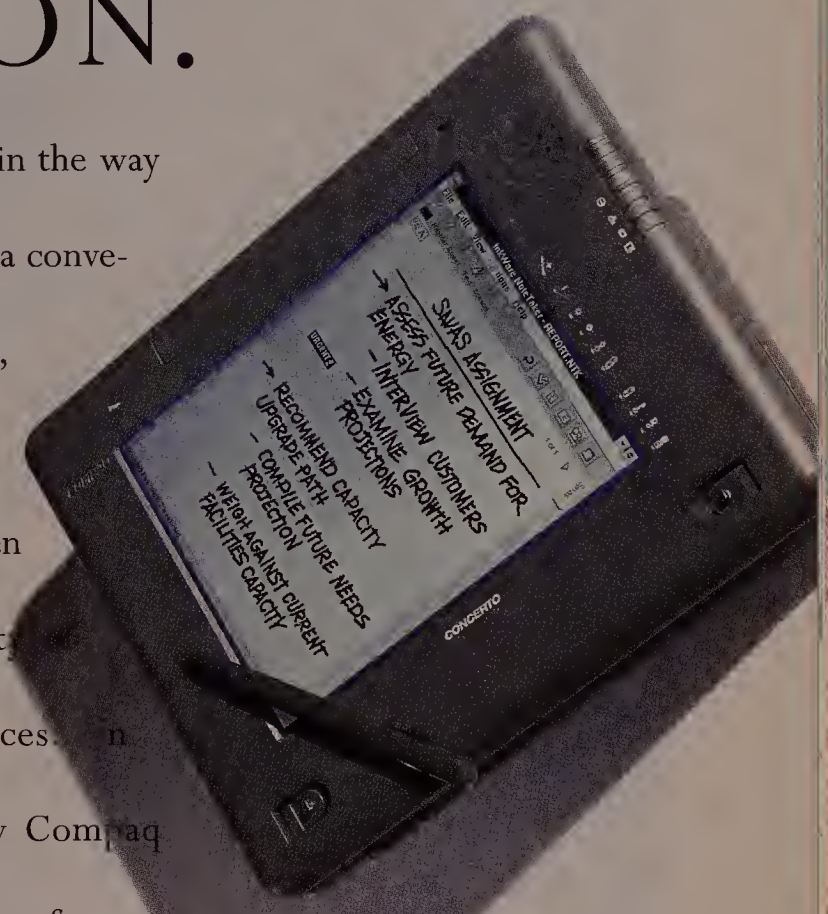
IF IT LOOKS like the new Compaq Concerto has a split personality, well, it does. Which is exactly what makes it the most useful notebook computer we've ever built. It's a full-function, 486 notebook with pen capability.



ONAL NOTEBOOK WITH
AD FOR TRADITION.

The keyboard detaches so it's as flexible in the way it works as you have to be. It comes with a convenient Flexhandle, a high-definition, 9.5" Maxlight display and with the two PCMCIA Type II slots, it even allows you to add a variet industry-standard devices. n other words, the new Compaq Concerto works in an incredible number of ways. Which, come to think of it, is probably a lot like the way you work, isn't it? For more details on the new Compaq Concerto just call 1-800-345-1518.





The perfect solution for meetings. Just bring the tablet and pen and you can quietly take notes, access files, work on budgets. (Or, should the meeting get really slow, you can pursue an art career.)

COMPAQ

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Circle 88 on reader service card

Communications for the Portable Office

WHEREVER YOU GO, THERE YOU ARE. LET THE WORLD KNOW YOU'VE ARRIVED.

MODEMS: PLUG IN, DIAL UP, AND GO—STAYING IN TOUCH WAS NEVER EASIER

COMPANY	PRODUCT	LIST PRICE	DATA/FAX RATE (BPS)	SLOT TYPE	WARRANTY (YEARS)	READER SERVICE NUMBER
Apex Data 800/841-2739	PCMCIA Modem	$369	14,400/14,400	II	Lifetime	651
	PCMCIA Modem	$299	9600/9600	II	Lifetime	651
	PCMCIA Modem	$279	2400/9600	II	Lifetime	651
AST Research 800/876-4278	PCMCIA Data/Faxmodem 14.4D/96F	$550	14,400/9600	II	1	652
	PCMCIA Data/Faxmodem 24D/96F	$349	2400/9600	II	1	652
	PCMCIA Data Modem 24D	$257	2400	II	1	652
AT&T Paradyne 800/482-3333	AT&T Paradyne KeepInTouch Card	$350	14,400/14,400	II	2	653
ATI Technologies 905/882-2600	ATI 14400 ETC Express	$349	14,400/14,400	II	5	662
Epson America 800/289-3776	Epson Fax/Modem Card EFM 144	$499	14,400/14,400	II	2	654
EXP Computer 516/496-3703	EXP ThinFax Modem EFM 96	$499	14,400/14,400	I	Lifetime	655
	EXP ThinFax Modem	$399	9600/9600	I	Lifetime	655
	EXP ThinFax Modem	$299	2400/9600	I	Lifetime	655
Intel Corp. 800/538-3373	Intel PCMCIA Faxmodem	$399	14,400/14,400	II	3	656
	Intel PCMCIA Faxmodem	$379	9600/9600	II	3	656
	Intel PCMCIA Faxmodem	$249	2400/9600	II	3	656
Linksys 800/546-5797	PCMCIA data/faxmodem	$349	14,400/14,400	II	1	657
	PCMCIA data/faxmodem	$199	2400/9600	II	1	657
MagicRAM 213/413-9999	Voice/Fax/Modem Card	$245	2400/9600	II	1	658
Megahertz Corp. 800/527-8677	Megahertz PCMCIA Data/Fax Modem with xJack	$399	14,400/14,400	II	5	659
	Megahertz PCMCIA Data/Fax Modem with xJack	$319	9600/9600	II	5	659
	Megahertz PCMCIA Data/Fax Modem with xJack	$249	2400/9600	II	5	659
Toshiba America Information Systems	Noteworthy 2400/9600 Data/Fax Modem	$279	2400/9600	II	3	660
800/959-4100	Noteworthy 14.4 Data/Fax Modem	$469	14,400/14,400	II	1	660
U.S. Robotics 800/342-5877	WorldPort Dual Standard Cellular Fax	$995	14,400/14,400	II	2	661
	WorldPort 14.4 Fax PCMCIA	$399	14,400/14,400	II	2	661

For more information about all products in this table, circle reader service no. 908.

LAN ADAPTERS: MAKE A QUICK CONNECTION TO THE OFFICE LAN WITHOUT A DOCKING STATION

COMPANY	PRODUCT	LIST PRICE	NETWORK	SLOT TYPE	WARRANTY (YEARS)	READER SERVICE NUMBER
Apex Data 800/841-2739	Ethernet PCMCIA Adapter	$289	Twisted pair	II	Lifetime	663
	Ethernet PCMCIA Adapter [1]	$289	Thin coax	II	Lifetime	663
AST Research 800/876-4278	PCMCIA Token-Ring Adapter	$725	Token ring	II	1	664
	PCMCIA Ethernet LAN Adapter 10BT	$303/$321	Twisted pair/Thin coax	II/II	1/1	664/664
Fujitsu Microelectronics 408/922-9000	PCMCIA Ethernet Card	$173	Twisted pair	II	1	665
	PCMCIA Ethernet Card	$187	Thin coax	II	1	665
Linksys 800/546-5797	EthernetCard/EthernetCard [1]	$299/$299	Twisted pair/Thin coax	II/II	3/3	666/666
MagicRAM 213/413-9999	PCMCIA Ethernet Credit Card Adapter	$295	Twisted pair	II	5	667
	PCMCIA Ethernet Adapter	$295	Thin coax	II	5	667
	PCMCIA Token Ring Adapter	$595	Token ring	II	5	667
New Media Corp. 800/227-3748	Ethernet LAN Adapter	$249	Twisted pair	I	Lifetime	668
	Ethernet LAN Adapter	$309	Thin coax	I	Lifetime	668
Proxim 415/960-1630	RangeLAN2/PCMCIA	$695	Twisted pair and thin coax	II	2	669
Socket Communications 510/670-0300	Socket EA Ethernet Adapter	$399	Twisted pair	II	2	670
	Socket EA Plus Ethernet Adapter	$420	Twisted pair and thin coax	II	2	670
Toshiba America Information Systems	Noteworthy Ethernet Adapter 10BaseT	$225	Twisted pair	II	1	671
800/959-4100	Noteworthy Ethernet Adapter 10Base2	$240	Thin coax	II	1	671
	Noteworthy 16/4 Token-Ring Adapter	$595	Token ring	II	1	671
Xircom 818/878-7600	CreditCard Ethernet Adapter	$399	Twisted pair and thin coax	I	2	672

[1] This 10Base2 thin-coax card does not require an external power supply; the others do.

For more information about all products in this table, circle reader service no. 901.

The problem is aggravated by notebook manufacturers that don't include an extensive set of drivers for the cards already on the market. So when you swap cards, you may have to run installation programs or fiddle with setup programs.

What's being done to resolve this problem? First, major notebook vendors, such as Compaq, IBM, AST, and Toshiba, conduct in-house compatibility tests that certify which PC Cards work with their systems. Your best chance of eliminating plug-and-play problems is to buy PC Cards from a list of recommended cards provided by your notebook's manufacturer.

Microsoft is taking a major step toward resolving the compatibility issue by developing a version of Windows that will incorporate PC Card software management tools licensed from SystemSoft of Natick, Massachusetts. SystemSoft's CardSoft PCMCIA software will load drivers automatically as part of Windows' initialization process. Then, when you plug in a PC Card, Windows and your applications will automatically determine the Card's capabilities and resources and treat it as they would any other host resource.

For now, the real compatibility trick is to make sure your system includes PC Card drivers specific to each card that you're interested in. For example, if your notebook doesn't have a driver for the AT&T Paradyne fax-modem, there's a good chance it won't work. Furthermore, having the right PC Card fax-modem driver software does not mean you're in luck when you insert an SRAM Card. For that you'll need a flash file system in your operating system software as well as specific drivers for the card. To be safe, check with your notebook vendor before you buy to make sure your notebook supports the cards you want.

Wireless World

Staying in touch on the road is one of the greatest benefits of PC Cards. Wireless PC Cards let you stay connected to your network or business just as you would with a cellular phone. Unfortunately, though wireless PC Cards are available today, the local- and wide-area communications technologies make it more complicated than just plugging in your PCMCIA card.

There are two fundamental types of wireless communications: local and wide area. Local-area communications can use low-power transmitters to link portable systems for buildingwide and campuswide networking. Low-power systems avoid FCC licensing and the fees required in cellular-based wide-area systems, says Dean Chang, RangeLAN/PCMCIA product line manager for Proxim in Mountain View, California. Proxim makes wireless LAN adapters that are compatible with most network operating systems.

For wide-area systems, you need to subscribe to a data-handling service that covers the geographical areas you are interested in. But today's wide-area cellular telecommunications systems are not available everywhere, and competing wireless technologies could make things more complicated.

Desktop PCMCIA Options

PCMCIA isn't just for notebooks. Several manufacturers, including IBM and Hewlett-

New Technologies: The Future Is Now

From Multimedia to SCSI, PCMCIA options are expanding rapidly.

COMPANY	PRODUCT	DESCRIPTION	LIST PRICE	SLOT TYPE	WARRANTY	READER SERVICE NUMBER
Adaptec 408/945-8600	APA-460 SlimSCSI Adapter	SCSI Adapter	$349	II	1 year	673
AST Research 800/876-4278	PCMCIA SCSI Adapter	SCSI Adapter	$238	II	1 year	674
Curtis 612/631-9512	PCM1-SU Carddrive	Internal-mount desktop slot	$389	I–III	1 year	675
	PCM1-FA Carddrive	Internal-mount desktop slot	$399	I–III	1 year	675
	CardShark II-I	Internal-mount desktop slot	$299	I–III	1 year	675
	CardShark II-E	External desktop system slot	$349	I–III	1 year	675
Databook 716/889-4204	TMB-240	Internal-mount desktop slot	$249	I–III	90 days	676
	TMB-250	Internal-mount desktop slot	$299	I–III	90 days	676
	TMD-500	External desktop system slot	$299	II	90 days	676
	TMD-550	External desktop system slot	$349	II	90 days	676
Data I/O 800/332-8246	CardPro 1	External desktop system slot	$339	I, II	1 year	677
	CardPro 2	Internal-mount desktop slot	$349	I–IV	1 year	677
	CardPro 2	External desktop system slot	$389	I–IV	1 year	677
MagicRAM 213/413-9999	PCMCIA SCSI II Adapter	PCMCIA SCSI II Adapter	$249	II	1 year	678
MiniStor Peripherals Corp. 800/943-0165	DockIT Socket	Internal-mount desktop slot	$249	I–IV	1 year	679
Motorola 800/542-7882	NewsCard [1]	Wireless receive-only modem	$250	II	1 year	680
New Media Corp. 800/453-0550	Visual Media SCSI	SCSI adapter	$299	I	Lifetime	681
	.WAVjammer	16-bit stereo sound card	$399	I	Lifetime	681
Socket Communications 510/670-0300	Serial I/O Adapter	RS-232 adapter	$215	II	2 years	682
	Mobile GPS	Global positioning system	$795	II	2 years	682
Toshiba America Information Systems 800/959-4100	Noteworthy Type II PCMCIA 3270 Emulation Card	Terminal emulator adapter	$515	II	1 year	683

[1] NewsCard will be distributed through key computer manufacturers and paging service providers—for example, Motorola's EMBARC nationwide service. Price is estimated (800/362-2724).

For more information about all products in this table, circle reader service no. 902.

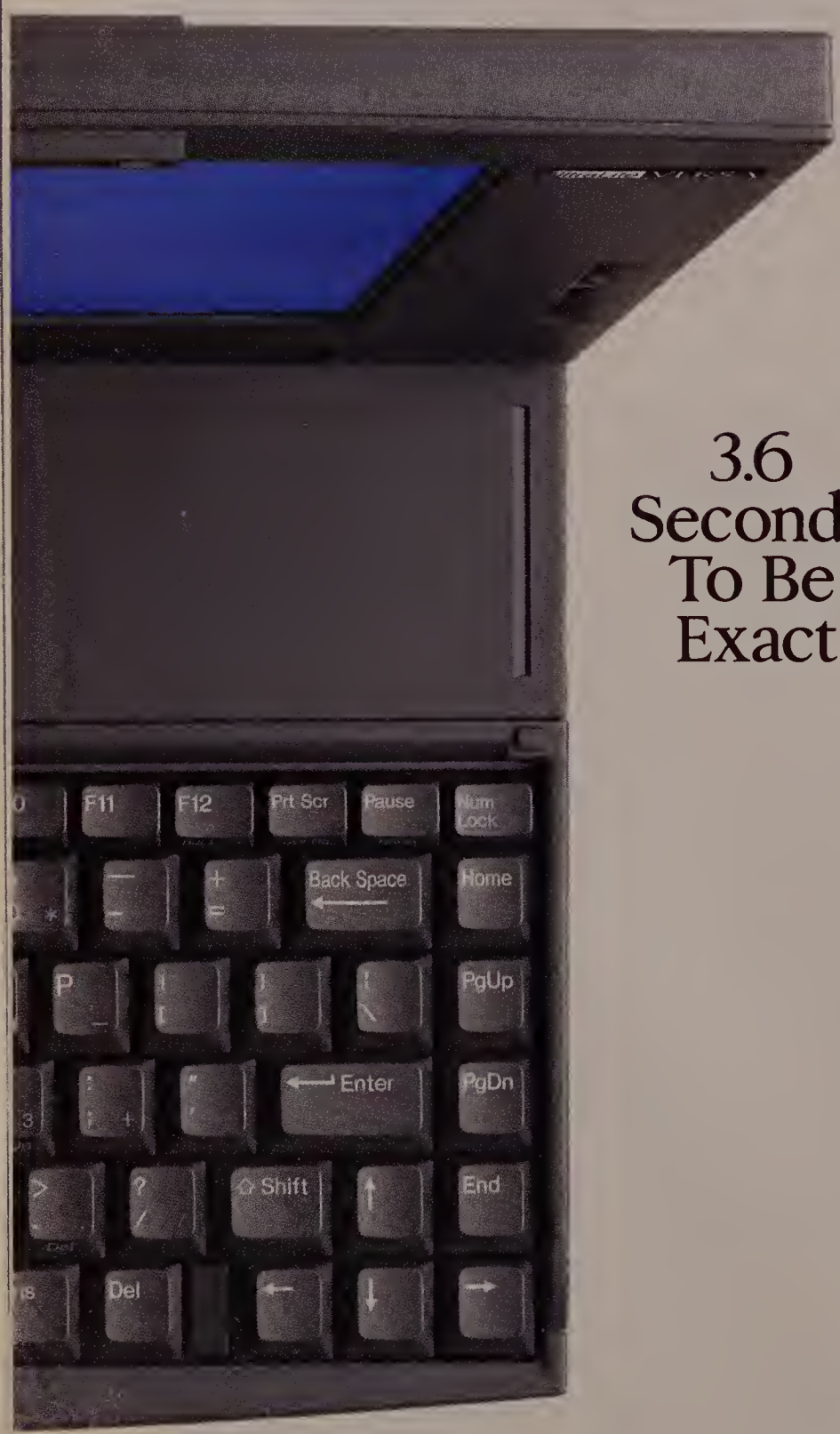
Connecting Your Notebook To The LAN Does Take A Little Time.

In a matter of seconds, Xircom can connect any notebook to any local area network anywhere.

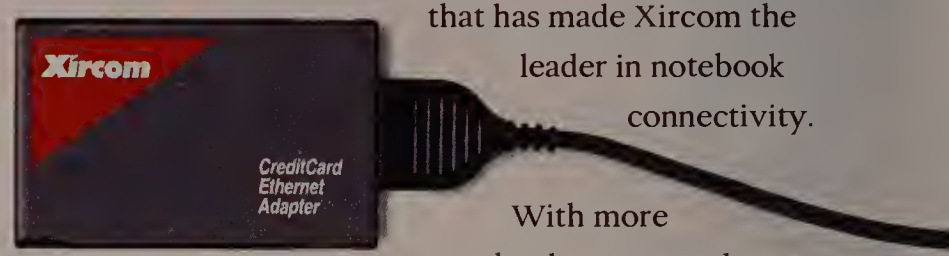
Simply slide a Xircom CreditCard LAN Adapter into your notebook's PCMCIA slot or plug a Xircom Pocket LAN Adapter into your notebook computer's parallel port.

That's it. There are no tools, batteries or AC adapters required.

It's this plug-and-play simplicity that has made Xircom the leader in notebook connectivity.



3.6 Seconds To Be Exact.



With more notebooks connected to more LANs than all other LAN adapter vendors combined.

We make a full line of Pocket and CreditCard adapters for local, remote and cordless notebook-to-LAN connections. All backed by a two-year warranty and a lifetime, half-price upgrade policy.

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Circle 240 on reader service card

Vroooom! When you're on the road, there's no time to slow down for faxmodem hassles. And with Intel PCMCIA cards, you'll go from zero to faxing in no time.

It's as easy as inserting the card in any Type II or Type III slot. Unlike other cards, Intel faxmodems require no powering down, no reconfiguring, and no com ports to set. (No detours here!)

Applications won't bring you to a screeching halt either. The card launches and configures fax and communications software so you can fax without annoying extra steps.

Of course the card is made for the road. With a built-in phone line adapter. Sleep features to preserve battery power. On-line manuals. And three data/fax speeds on the industry's most durable PCMCIA card.

So leave your PCMCIA faxmodem obstacles in the dust. Just call 1-800-538-3373, ext. 1015 or dial Intel's automated FaxBack* service at 1-800-525-3019 and ask for document #9713. Then go see your reseller. And get ready to hit the gas.

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Circle 109 on reader service card

Lots of Storage in a Small Space

NOW YOU CAN HAVE THE MEMORY OF AN ELEPHANT IN YOUR SHIRT POCKET.

SOLID STATE MEMORY: INSTANT RECALL

COMPANY	PRODUCT	PRICE	SIZE (MINIMUM/ MAXIMUM)	ACCESS TIME (NS)	SLOT TYPE	WARRANTY (YEARS)	READER SERVICE NUMBER
Advanced Micro Devices 800/222-9323	Flash Memory PC Card	$170/$450	1MB/4MB	250	I	1	684
Boca Technology Group 407/750-1528	Boca Seadisk SRAM Card	$65/$400	128K/2MB	250	I	1	685
	Boca Seadisk Flash Card	$76/$500	256K/4MB	250	I	1	685
Epson America 800/289-3776	RAM Card	$180/$390	500K/2MB	200	I	1	686
IBM Microelectronics 800/426-0181	Flash Memory Cards	$268/$638	1MB/4MB	250	I	3	
	SRAM Memory Cards	$264/$536	512K/2MB	250	I	3	
	SRAM-Flash Combo	$313/$587	512K/3MB	250	I	3	
EXP Computer 516/496-3703	PCMCIA2 Static RAM	$129/$379	256K/2MB	250	I	Lifetime	688
Fujitsu Microelectronics 408/922-9000	Low Power SRAM	$52/$388	64K/2MB	200	I	Lifetime	689
	Flash	$77/$639	256K/4MB	200–250	I	Lifetime	689
MagicRAM 213/413-9999	SRAM Memory Card	$149/$345	512K/2MB	100	I	5	690
Memorex Computer Products 800/222-1150	SRAM	$169/$499	256K/2MB	200	I	1	691
New Media Corp. 800/227-3748	PCMCIA Flash Cards	$90/$699	256K/4MB	150	I	Lifetime	692
	PCMCIA SRAM	$75/$318	256K/2MB	150	I	Lifetime	692
Toshiba America Information Systems 800/959-4100	SRAM	$110/$300	256K/2MB	150	I	1	693

For more information about all products in this table, circle reader service no. 903.

MASS STORAGE: MEDIA WITH THE CAPACITY OF A HARD DRIVE IN A FRACTION OF THE SPACE

COMPANY	PRODUCT	LIST PRICE	CAPACITY	SHOCK (G'S) OPERATING/ NONOPERATING	SLOT TYPE	WARRANTY (YEARS)	READER SERVICE NUMBER
Epson America 800/289-3776	ATA Series Flash Card	$399/$1499	2.5MB/20MB	1000/1000	II	2	694
Integral Peripherals 303/449-8009	PocketFile 42	$495	40MB	100/500	III	1	695
	PocketFile 85	$695	85MB	100/500	III	1	695
	PocketFile 105	$750	105MB	100/500	III	1	695
Maxtor Corp. 408/432-1700	MobileMax Hard Drive	$495	105MB	100/300	III	1	696
MiniStor Peripherals Corp. 800/943-0165	PCMCIA Drive 42	$499	42MB	200/200	III	1	697
	PCMCIA Drive 85	$549	85MB	200/200	IV	1	697
	PCMCIA Drive 128	$699	128MB	200/200	IV	1	697
Seagate Technology 408/438-8111	Flash Card	$209/$1029	1MB/20.9MB	1000/1000	II	1	698
	Hard Disk Drive ST7050P	$395	42MB	10/300	III	1	698
SunDisk Corp. 408/562-0500	SunDisk SDP5 Series	$240/$1200	1.8MB/40MB	1000/1000	II	1	699
Toshiba America Information Systems 800/959-4100	Noteworthy PCMCIA Hard Disk Drive 105	$659	105MB	200/200	IV	1	700

For more information about all products in this table, circle reader service no. 904.

Packard, offer desktop systems with a PCMCIA slot option. Some analysts expect two-thirds of shipping desktops to include PCMCIA slots by 1997.

You can also buy a slot that fits into a drive bay, as well as external models that connect to your PC via the parallel port. While installing an internal drive is similar to mounting a floppy drive, the internal model includes an AT bus connector card so you can run a modem off the same slot, with your system alternately viewing it as a COM port or as the next logical drive.

SUMMING IT UP

There are alternatives to PCMCIA: Notebook docking stations have the capability to automatically connect your mobile computer to the power supply, hard drives, LAN card, modem, and monitor.

But nothing will beat the flexibility and expandability of PCMCIA. Vendors such as New Media are bringing the first PCMCIA sound cards to market, which makes creating a multimedia-capable notebook as easy as slipping in a card. And the diversity of PCMCIA promises to be as great as that found in today's AT add-in card market. For instance, Socket Communications makes a Global Positioning System PC Card, which uses satellite transmissions to calculate your position to within a few feet.

For now, before you buy a system make sure the manufacturer supplies the software necessary for the PC Cards you'll want to use. And minimize potential incompatibilities by buying your PCMCIA peripherals from your PC vendor.

Gene Smarte is a PC World *contributing editor based in Riverside, California.*

Why is this traveling troubleshooter so tranquil?

He just took off with a 4-pound color notebook from

AMBRA

for a very easygoing price

Four Pounds of Colorful Computing.

$1,899

SN-Series

FEATHERWEIGHT AND FULL FORCE.

Frequent flyers and life-on-the-road types take note: New lightweight **486SX** notebooks from AMBRA™ combine **25 MHz** speed with first-class computing capabilities — including **color**— yet tip the scales at **a mere four pounds!**

Cool mono

Hot color

From **clean-edged** STN **images** to easy cursor tracking, AMBRA lightweight notebooks' STN color and mono screens are the picture of **price/performance**. Our larger notebooks' STN color screens offer the added benefits of extra-generous viewing area and **dual-scan technology**.

PC Computing calls **active matrix color** "beautiful to behold."[1] One glance at the uniformly brilliant, fast-refresh, glare-free TFT screen of our premium notebook, and you're sure to agree!

W E

If your work keeps you on the move, call AMBRA. Our new MOBILE SYSTEMS pack lots of POWER yet travel LIGHT.

DAUNTLESS POWER BEYOND OFFICE DOORS.

N-Series

With new high-speed, high-performance AMBRA notebooks, no application is too demanding. You have the power to do it all! At **6.6 pounds**, these machines are as trim as they are fast — **33 or 50 MHz.** Besides **486SX or DX2** processing clout, they come with a full array of desktop-level features, and **high-volume hard disk capacity.**

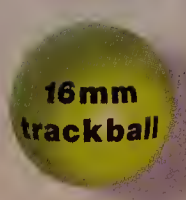
SUSPEND **RESUME**

Work steadily through a "stop and start" day! AMBRA SN-Series notebooks let you easily halt mid-application, and later pick up in the same place.

Comfortable keyboards, fingertip mouse function.

Some notebook keyboards feel cramped and shallow, with pointing devices that are unwieldy or easily lost. Not ours. Here's why:

- 86 keys, including 12 function keys
- Standard keyspacing
- 3mm key travel (strike depth)
- Integrated 16mm trackball



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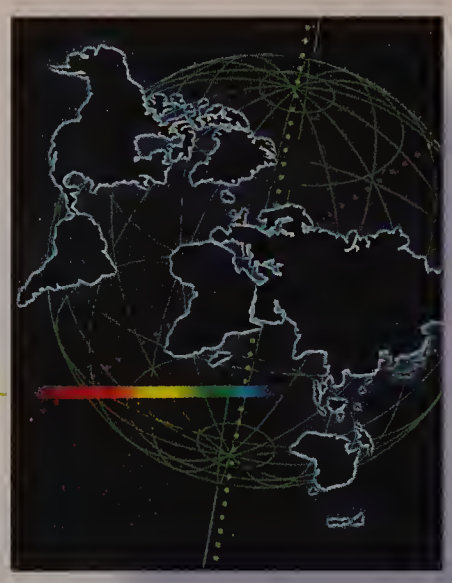
1-800-239-5737

Fax figures to far-away colleagues!

Tie into an onsite network!

Download data from your host's host!

When you return, be instantly at home!



SMALL OPTIONS, BIG OPPORTUNITIES– EVERYWHERE YOU GO.

AMBRA mobile systems make room for your pick of credit-card-size PCMCIA options, providing everything from fax/modem function to on-the-spot mainframe connectivity!

- 9.6 kbps fax/modem
- 14.4 kbps fax/modem
- Token-Ring adapter
- Ethernet adapter (10BaseT)
- 3270 adapter

With AMBRA, mobile computing power goes hand-in-hand with capability to COMMUNICATE and CONNECT.

"ROAD WARRIOR" OPTION BUNDLE: $386

For SN-Series: Includes PCMCIA 2.4/9.6 kbps fax/modem, extra battery, battery charger, carrying case

"TRAVELER" OPTION BUNDLE: $288

For N-Series: Includes PCMCIA 2.4/9.6 kbps fax/modem and extra battery

"INSTANT OFFICE" OPTION BUNDLE: $927

For N-Series: Includes docking station, 15" FST color monitor, full-size keyboard

"QUICK DOCK" OPTION BUNDLE: $417

For SN-Series: Includes port replicator, 14" UVGA color monitor, full-size keyboard

BACK AT YOUR DESK: CONVENIENT DOCKING.

With an optional docking station, your AMBRA mobile system can be instantly plugged into extra storage, extra peripherals, networks and resources throughout your company!

N-Series Docking Station
4 ISA slots (2 VESA on local bus)
2 drive bays (5.25" and 3.5")
2 internal speakers
2 serial ports
1 parallel port
1 video port
1 keyboard port
$499

SN-Series Docking Station
2 ISA slots
2 serial ports
1 parallel port
1 video port
1 keyboard port
$249

SN-Series Port Replicator
2 serial ports
1 parallel port
1 video port
1 keyboard port
$89

LIGHTWEIGHT NOTEBOOKS

N-Series

N450T

- 486DX2, 50 MHz
- 8MB RAM, max: 12MB
- 3.5" 1.44MB diskette drive
- 200MB hard disk
- 9.5" TFT active matrix color screen
- 1 PCMCIA slot, Type III
- Integrated 16mm trackball
- MS-DOS,® Windows™ 3.1
- Carrying case
- 6.6 lbs, including battery

$3,999

N450C

- 486DX2, 50 MHz
- 4MB RAM, max: 12MB
- 3.5" 1.44MB diskette drive
- 200MB hard disk
- 9.5" STN dual-scan color screen
- 1 PCMCIA slot, Type III
- Integrated 16mm trackball
- MS-DOS, Windows 3.1
- Carrying case
- 6.6 lbs, including battery

$2,699

N433C

- 486SX, 33 MHz
- 4MB RAM, max: 12MB
- 3.5" 1.44MB diskette drive
- 120MB hard disk
- 9.5" STN dual-scan color screen
- 1 PCMCIA slot, Type III
- Integrated 16mm trackball
- MS-DOS, Windows 3.1
- Carrying case
- 6.6 lbs, including battery

$2,299

SN-Series

SN425C

- 486SX, 25 MHz, SL-Enhanced
- 4MB RAM, max: 20MB
- 170MB removable hard disk
- 7.8" STN color screen
- 1 PCMCIA slot, Type II
- Integrated 16mm trackball
- Suspend/Resume
- MS-DOS, Windows 3.1
- Slip case
- 4 lbs, including battery

$1,899

(With external 3.5" 1.44MB diskette drive, add $99.)

SN425

- 486SX, 25 MHz, SL-Enhanced
- 4MB RAM, max: 20MB
- 80MB removable hard disk
- 8.2" monochrome LCD
- 1 PCMCIA slot, Type II
- Integrated 16mm trackball
- Suspend/Resume
- MS-DOS, Windows 3.1
- Slip case
- 4 lbs, including battery

$1,399

(With 170MB hard drive, add $150. With external 3.5" 1.44MB diskette drive, add $99.)

intel inside®

Featherweight.

Fierce COLOR.

Friendly price.

FIRM CONFIDENCE.

AMBRA covers every mobile system with a 30-day money-back guarantee and a one-year limited warranty. For just $99, an optional Executive warranty is available.[2] With either warranty, you can rely on toll-free technical support around the clock!

FULL CONVENIENCE.

To place an order or get more information, just call — weekdays 8 am to 11 pm, weekends 10 am to 7 pm (ET). We accept Visa,® MasterCard,® Discover® and American Express® — and purchase orders from qualifying businesses. Pick up the phone today!

AMBRA™

In Canada,[3] call 1-800-363-0066, Ext. 5737

1-800-239-5737

[1] Ron White, "In Search of the Ultimate Notebook," *PC Computing*, July 1993. [2] Please call for details regarding AMBRA's money-back guarantee, limited warranty and Executive warranty. Return shipping and insurance charges are the responsibility of the customer. [3] Offerings may differ in Canada.

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Here's How

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HELP LINE Q & A

Tip of the Month

WINDOWS SCREEN SHOTS: A simple Recorder macro can take screen shots from within Windows applications. In Program Manager, select the StartUp group. Press <Alt>FNI<Enter>, type Program Manager, press <Tab>, type PROGMAN.EXE, then press <Tab><Tab>Z<Enter>. In the Accessories group, click Paintbrush, press <Alt>-<Enter>, and then press <Tab><Tab><Tab>P<Enter>.

Launch Recorder and select Macro • Record. Type Screen Shot, press <Tab>G, and check only Ctrl. From the Playback To list, select Any Application and check only Enable Shortcut Keys. From the Record Mouse list, select Ignore Mouse. Type a description and then click Start.

Press <Ctrl>-<Alt>-Z, then <Ctrl>-<Alt>-P. In Paintbrush, press <Ctrl>-V, then <Alt>FA. With the mouse, click Cancel. Switch to Recorder and save the macro. Switch back to Recorder and save the macro file as SCREEN.REC. Now, whenever you're using Recorder in Windows and you have the SCREEN.REC macro file open, you can simply press <Print Screen><Ctrl>-G to launch Paintbrush, copy the screen, have Paintbrush prompt you for a file name, and save the file. Press <Alt>-<F4> to exit Paintbrush.

Shane Rau, Assistant Technical Editor

Tell Your Computer Where to Go

Q I am disabled but would like to work with computers. I can't use a keyboard and need to find systems for mobility-impaired people. Can you refer me to companies that make products for disabled people?
Monica Brown, New York

A There are quite a few low-cost voice recognition systems on the market these days. Most audio board vendors bundle voice recognition software—and in some cases a microphone—with their products. Several other companies offer Windows-compatible voice recognition programs. These programs let you navigate DOS and Windows applications, triggering menu commands and macros by voice, but they don't provide completely hands-free operation of the PC.

Currently systems that try to recognize everything you say cost thousands of dollars. DragonDictate-30K 2.0, from Dragon Systems, costs $4995 and comes with a 30,000-word vocabulary. Dragon pioneered voice recognition, and its technology is incorporated into application navigation products sold by IBM, Media Vision, and Microsoft. Applications Express's $4995 Speech Secretary is designed to compete with DragonDictate; the company says Speech Secretary excels at recognizing the speech of users who have difficulty speaking, such as those challenged by cerebral palsy. Kurzweil Applied Intelligence, which has long offered products for the disabled, now also sells Kurzweil Voice, with a 50,000-word vocabulary and a 200,000-word online dictionary, for $3000. IBM's Voice Type 2 (developed for IBM by Dragon Systems) lists for $2195 but offers a vocabulary of only 7000 words.

There are also other kinds of adaptive equipment for text entry and program control. For example, Ability Systems makes a device called the Proportional Keystroke Scanner. The user "sips" an included mouthpiece to control the scanning cursor of a small display that sits atop the PC's monitor. When the cursor is over the desired letter, the user "puffs" into the mouthpiece to send the letter to the PC.

For an in-depth listing of assistive technologies for computer access (and for communication and control in general), get a copy of *Trace ResourceBook*, published by Trace Research and Development Center, Waisman Center, University of Wisconsin at Madison (608/263-2309). This phone book–size compilation can't keep up with the newest offerings, but it offers a comprehensive starting point for searching out adaptive equipment. In it you'll find a foot-controlled mouse, a head-pointing system to replace keyboards, voice recognition systems, and much more. You might also contact Accent on Information, which runs a computerized information system covering, among other topics, assistive products and devices, and Access Unlimited, which tracks adaptive computer technologies.

- **Ability Systems** 215/657-4338
  Reader service no. 754
- **Accent on Information** 309/378-2961
  Reader service no. 752
- **Access Unlimited** 800/848-0311, 713/781-7441, 713/781-3550 (fax)
  Reader service no. 753
- **Applications Express** 908/389-3366, 908/542-6762 (fax)
  Reader service no. 755

- **Dragon Systems** 800/825-5897, 617/965-5200, 617/527-0372 (fax)
  Reader service no. 756
- **IBM** 800/426-2968
- **Kurzweil Applied Intelligence** 617/893-5151, 617/893-6525 (fax)
  Reader service no. 757

Fed Up With Fax

Q I received WinFax Pro with my Gateway 2000 Telepath fax-modem, but I can't use the program. It works well enough at first, but after several hours WinFax Pro freezes; trying to send a fax or close it seems to crash the entire system. Gateway tech support had no solution. I'm ready to give up on both the fax-modem and WinFax Pro.

Also, I'm considering switching to Windows NT, and I'm wondering if there are any NT-specific fax programs. I've heard that DOS and Windows fax software won't run under NT. Do you have any suggestions?
Barry L. Siegel, Ann Arbor, Michigan

A Fax technology's timing-sensitive nature can make faxing reliably under Windows 3.1 a challenge. According to one Telepath fax-modem owner on CompuServe, Gateway admitted its Rockwell chip set–based modems had difficulty with fax transmissions and had bugs in firmware. Apparently, the company never offered a swap or an upgrade and has since discontinued the Rockwell modem in favor of one manufactured by U.S. Robotics.

To test your fax-modem, use it with other communications programs under varying conditions: Can you use the modem to dial, connect to services such as America Online and CompuServe, download files, and disconnect properly? Test the fax capability using the DOS utility WFXTEST.EXE that is provided with WinFax Pro 3.0 (you'll find it in your WINDOWS or WINFAX directory), and try using the DOS fax software that's also included.

Next, be sure to download and install two WinFax Pro upgrade patches Delrina released last year, WFX304.ZIP and WFX306.ZIP. You'll find them in the Delrina forum on CompuServe (GO DELRINA) and on the company's own BBS (416/441-2752). The ZIP files contain a number of patch-related files and detailed instructions in a README file; you must install the patch contained in WFX304.ZIP first. When you're done, you may find that your annoying glitch or incompatibility is gone. If trouble persists, call Delrina's tech support line at 416/441-0921; it may be able to offer an INI-file tweak that gets things working smoothly. If you determine that there is a problem with the fax-modem, call Gateway's tech support for a replacement.

As for Windows NT–compatible fax software, its absence is one of the key reasons many PC users haven't adopted NT. Delrina's CompuServe forum has been deluged with messages from users wanting to run WinFax Pro under NT. So far, the company has responded only with polite "we're taking it into consideration" replies. Microsoft's Windows NT porting lab reports that it is working on a 32-bit fax driver for Windows NT in conjunction with several other companies. The lab also says that by the time you read this, NT-compatible fax programs may be available from two or three vendors.

Seeking Setup Security

Q I am responsible for a public library PC that's available for use free of charge. We have a variety of educational and productivity programs for all ages installed on the computer, and our users range in experience from tenderfoot to hacker.

Most patrons use the PC courteously, but occasionally someone will exit the menu system, access the BIOS setup program, and start messing around with the settings there, often disabling the computer temporarily. Is there any way we can keep people from exiting the menu system, or at least intercept the key commands used to enter the setup program and require a password?
John M. Huber, Milwaukee

USER GROUP OF THE MONTH

Phoenix PC Users Group

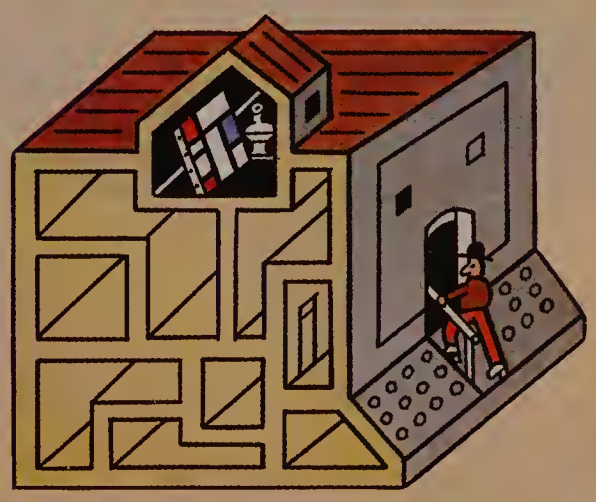
The February user group tips come from the Phoenix PC Users Group, an all-volunteer organization consisting of more than 1000 computer users in the greater Phoenix area. PhxPCUG holds meetings at the Holiday Inn Corporate Center on the west side of town on the third Tuesday of each month and at the Ramada Sky Harbor on the east side of town on the following Wednesday of each month. Meetings start at 6:30 p.m. PhxPCUG offers a variety of special interest groups, including ones for Windows, OS/2, home users, LANs, desktop publishing, CorelDraw, and spreadsheets. A multiline BBS features more than 1GB of shareware and public-domain programs, and a large message base. The 40-page monthly newsletter, the *Phoenix PC Users Group News*, features reviews, news about discounts, and a list of members who are available to answer questions.

Contact Ray Moore, president, at P.O. Box 35637, Phoenix, AZ 85069-5637, or call 602/222-8511 to get more information or to leave a message on the 24-hour voice-mail system. You can access the group's BBS by calling 602/222-5491. Membership costs $40 a year.

Reader service no. 758

X-RAY VISION FOR DIR: Finding hidden files was difficult before the DOS Shell let you list them. Now MS-DOS 6.0 and 6.2 users who don't use the Shell can easily find them too. Just type DIR, (no space before the comma) and press <Enter> at a DOS prompt, and any hidden files will show up in the directory listing along with all the regular files.

Ray Moore
Phoenix PC Users Group



A You can find numerous password programs to download from services like America Online and CompuServe; however, none that I'm aware of trap specific keystroke sequences and prompt the user to enter a password. In any case, PCs aren't very well set up for software-based security—anyone with a bootable floppy disk can bypass most security programs and have complete access to any file on the hard disk. Assuming your system's floppy drives are locked or nonexistent, you can still reboot and bypass AUTOEXEC.BAT with a flurry of <Ctrl>-C's.

A few shareware security programs run from CONFIG.SYS or modify the hard disk's boot record, thereby offering a higher level of security. But the most direct way of protecting the system and the contents of your CMOS chip (configured via the BIOS setup program) is to upgrade the BIOS on the system board with one that incorporates password protection. Microid Research's MR BIOS costs about $60 from mail-order suppliers (call Microid for a list of resellers) and gives you two passwords: One protects the contents of CMOS from unauthorized changes, and the other prevents the computer from booting, whether there's a bootable floppy in the A: drive or not.

If replacing the BIOS and reconfiguring your PC is not your cup of tea, your system vendor or almost any clone shop will do it for a modest fee. However, even BIOS-level security isn't perfect. A determined saboteur need only open the system's case and disconnect the CMOS battery to erase the passwords.

- **Microid Research** 408/727-6991
  Reader service no. 759

Can We All Share?

Q Recently I read in Brian Livingston's book *Windows 3.1 Secrets* that it's essential to add the command SHARE /F:2048 /L:20 to AUTOEXEC.BAT to prevent file corruption under Windows. I've read numerous articles on configuring computers, but I don't remember seeing a similar exhortation. Did I miss something?

Sharon Severson,
Camrose, Alberta, Canada

A Livingston's point is valid, and running SHARE.EXE from AUTOEXEC.BAT can prevent file corruption that sometimes occurs when two programs try to modify the same file simultaneously. While this is probably unlikely on most people's systems, networks and multitasking environments like Windows increase the risk. It's important to note that many networks require that you *not* run SHARE.EXE—check your networking software's manual to be sure. Windows for Workgroups works fine with SHARE.EXE, but in 386-enhanced mode, the environment incorporates SHARE's capabilities, so loading the program via AUTOEXEC.BAT is superfluous. (If you run Windows for Workgroups in standard mode, then loading SHARE.EXE first is a good idea.)

In any case, you needn't append /F:2048 /L:20 to the SHARE command line; leaving those parameters off yields the same result. They are the program's default settings, allocating 2048 bytes of memory for storing the names and paths of shared files and determining the maximum number of files that can be shared. If your file sharing needs require more resources, you can bump these numbers up, but don't bother paring them down to save RAM—SHARE.EXE uses just as much memory with smaller numbers.

How Many Megahertz Is Enough?

Q I read an advertisement recently in *PC World* for an audio card capable of producing 16-bit, 48-kHz digital audio. My understanding is that 16-bit, 44.1-kHz audio is the same quality as that played from a CD and that CD-quality audio extends both above and below the range of an average person's hearing. What is the advantage of 48-kHz sampling?

Lance DeMello, Elk Grove, California

A To understand the advantage of a higher digital audio sampling rate, let's first step back and compare digital and analog audio. The difference between them is analogous to the difference between a color photo printed on photographic paper and the same photo printed in a magazine. Take a magnifying glass to a photographic print and, for the most part, you'll see smooth tones. The same photo reproduced in a magazine will reveal many fine cyan, magenta, yellow, and black dots under magnification. Since traditional printing processes can't re-create the smooth changes in color and tone found in photographic film and prints, printers approximate them using screens of solid-color dots of varying sizes, called halftones. The finer the screen, the higher the perceived quality of the photo.

Digital audio, like the printer's halftone, represents the smooth changes and tonal nuances in the original analog signal using a kind of "screen." In a 16-bit, 44.1-kHz digital audio recording, that screen has a resolution of 44,100 16-bit snapshots of the original signal per second. An audio board's maximum sampling rate has nothing to do with the range of frequencies it can capture, but rather the fineness of its digitization screen. Most boards, and many high-quality audio systems and speakers, have a frequency range of 20 Hz (cycles per second) to 20 kHz, which coincides with the range of frequencies most people can hear.

So where does the 48-kHz rate come from? Independent of the 44.1-kHz CD-Audio specification, Sony and other manufacturers were also developing Digital Audio Tape (DAT) systems and chose 48 kHz as a standard sampling rate. Most people can't hear the difference between a digital recording sampled at 44.1 kHz and the same signal sampled at 48 kHz. You, however, may be able to, and if you plan to make high-quality digital recordings using your audio board (especially for eventual output to DAT), the capability may be worth shopping around for. Just remember, you're collecting almost 10 percent more data per second at 48 kHz than at 44.1 kHz, so your audio files will be proportionally larger.

By Scott Spanbauer

Scott Spanbauer is a contributing editor for PC World. Help Line *welcomes your questions (see page 12 for contact information).*

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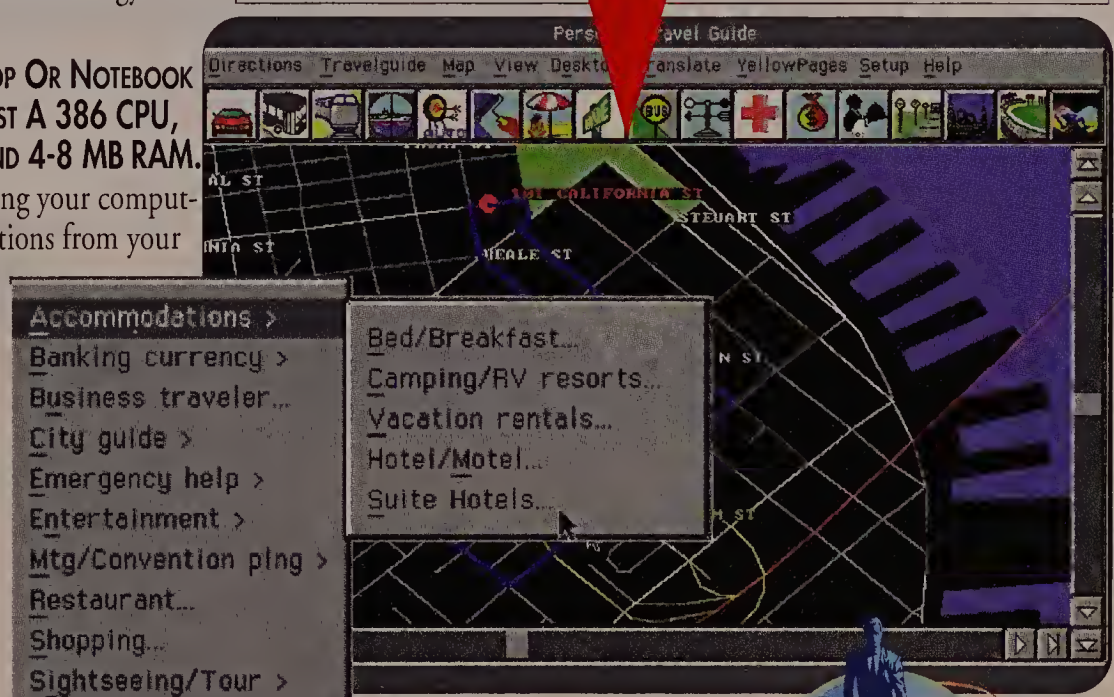
Functionality	Personal Travel Guide	Street Atlas USA	Local Expert	World View	Zagat/Axxis	Automap
Navigable City Maps	Yes	Yes	No	No	No	No
Driving Directions	Yes	No	No	No	Yes	No
Navigate One-Way Streets/Restrictions	Yes	No	No	No	No	No
Public Transit & Walking Directions	Yes	No	No	No	No	No
Maps Your Personal Phone Book File	Yes	No	No	No	No	No
GPS-capable	Yes	No	No	No	No	No
Built-in Language Translator	Yes	No	No	No	No	No
Electronic Yellow Pages	Yes	No	No	No	No	No
12 Detailed Travel Guides	Yes	No	No	No	No	No
Bank/ATM, Currency Conversion Locator	Yes	No	No	No	No	No
Emergency Help	Yes	No	No	No	No	No



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SPREADSHEETS Q & A

Keeping Your Balance With 1-2-3 Lookups

Q I use 1-2-3 release 3.4 to track our company's budgets. I have a workbook that tracks our subsidiary's account balances on one page and our parent company's budget on another. The problem is that the subsidiary and the parent have separate (but related) account number systems. I need a report that prints selected subsidiary account numbers and balances and the corresponding parent numbers and balances, but I can't figure out a good way to set this up.

Sonia Yip, Lexington, Kentucky

A Your best bet is to use 1-2-3's @VLOOKUP() function to grab appropriate values from both pages and copy them onto a third. I have created a sample multiple-sheet file to show how this is done (**FIGURE 1**). The example below consists of two lists of balances, each with its own account numbers, and a third sheet (at right) that combines them into a report. On the report sheet, a table cross-references the account numbers from the two lists, and the Data Table command uses a set of lookup formulas to generate the final report.

To set up the example, create A and B sheets like those you see in Figure 1. Before you enter account numbers, choose */Range•Format•Other•Label* to format the ranges you'll be entering them into. Why? Because you want the account numbers to be labels rather than actual numbers. If @VLOOKUP() can't find the number it's looking for, it returns the next lowest number; if it can't find a label, it returns an error message. Once you've entered the data, use */Range•Name•Create* to give range names to the account numbers, descriptions, and balances in each sheet (I've used SUB_ACCT for A:A3..A:C8 and PAR_ACCT for B:A3..B:C8).

Sheet C is where the work gets done. In A3:B8 you need to enter a table that matches the subsidiary and parent account numbers and give it a range name such as LOOKUP.

Now, to set up the data table report, enter one of the subsidiary account numbers (remember that it must be entered as a label) into C:D13 and enter the following formulas into these cells:

C:E13:
@VLOOKUP(D13,SUB_ACCT,1)
C:F13:
@VLOOKUP(D13,SUB_ACCT,2)
C:G13:
@VLOOKUP(D13,LOOKUP,1)
C:H13:
@VLOOKUP(G13,PAR_ACCT,2)

The formulas fetch values from the budget tables. For instance, the one in C:E13 looks in the leftmost column of the subsidiary account table SUB_ACCT to find the account number in D13. Then it returns the value from the second column of the table (1-2-3 counts the first column as zero, so the second column is 1). The other formulas are similar: Notice that C:G13 matches the subsidiary and parent account number from the lookup table, and C:H13 uses that number to look up the parent account data. You may want to copy these formulas into the rows beneath 13 as I've done in the example.

To generate the table, enter the account numbers you want in the report into column D beginning at C:D13 (I've listed three). Now, choose */Data•Table•1*, and select C:D13..C:H15 as the table range and C:D13 as Input Cell 1. When you press **<Enter>**, 1-2-3 uses each account number in C:D13..C:D15 to produce a line of results in the table. My sample file, LOOKUP.WK3, is available on PC World Online.

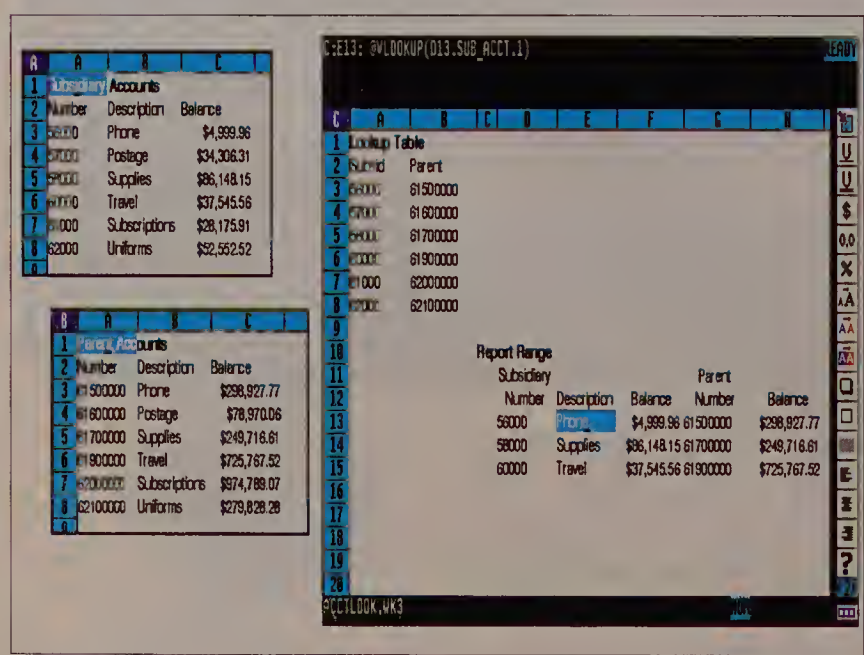

FIGURE 1: USE 1-2-3'S @VLOOKUP() FUNCTION to create a lookup table that allows you to combine two lists into a single report.

Excel 4.0 and 5.0 Chart Data Labels

Q I built an Excel 4.0 column chart, spent a lot of time formatting it, and then realized I needed data labels above the bars to display the actual data values. The only way I could do it was by selecting Chart•Attach Text and specifying the series number and bar number. Then I had to repeat the process for each bar. Is there a shortcut?

Marian McConnell, Salem, Virginia

A In Excel 4.0, your best bet is to use the Gallery command. First, double-click the chart to enter the Chart window. Select *Gallery•Column*, then choose the seventh option, the one that includes numbers as data labels. Now all your columns will be labeled, and you can edit any label by clicking on it. The only problem with this method is that it resets any formatting you may have done to the bars.

If you decide to upgrade to Excel 5.0 (a move I strongly recommend), you will be able to add data labels easily: Just right-click on the series that needs labels, choose *Insert Data Labels*, and pick whichever label style you would like for that series.

Selecting the Current Column With Excel 4.0 Macros

Q In our laboratory, we use Excel 4.0 to plot test data acquired as comma-delimited text. We're writing a macro to

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Master Class: 1-2-3 Release 4.0's Version Manager

What-if makes the world go round—you know, changing data values in a spreadsheet to see the effect on the formula values. It's the reason spreadsheets were invented and were embraced by accountants, analysts, and budgeteers everywhere. 1-2-3 release 4.0's new Version Manager significantly advances the sophistication of this essential spreadsheet task, and this month, I will show you how it works.

In brief, the Version Manager (VM) lets you create *versions*—alternative sets of values (or formulas) for selected named ranges—and store them with descriptive names and comments. You can play microlevel what-if by recalling selected versions into individual ranges, or you can use the Version Manager Index to combine a set of versions into a named *scenario*. Scenarios let you play what-if at a whole new level, as you swap whole sets of versions at once by choosing a scenario. There are additional tricks that we won't discuss here, including summary reports, the ability to organize and coordinate the work of multiple version authors, merging versions and scenarios from multiple copies of the same worksheet, automated version synchronization through Lotus Notes, and so on.

How do you use 1-2-3's Version Manager? First you'll need a worksheet to experiment with. We'll discuss the simple income statement shown in FIGURE 1, but any worksheet will do, as long as it's set up with a column of labels to the left of one or more columns of numbers and includes some totals or other formulas related to the numbers. We'll suppose that the numbers represent your business's sales and expenses for last year. As you prepare for an upcoming managers' meeting, you're pondering what might happen next year.

First, you'll need to create a set of versions to store last year's figures so you can easily recall those figures at any time. To do so, select *Range • Version* to display the Version Manager dialog box, which, unlike most dialog boxes, remains visible as you continue to work with the spreadsheet below it. Select the values you want to change (for example, the sales figures in B3..E3), then click the *Create* button in the VM dialog box. VM picks up the range name label SALES from cell A1 and suggests it as a name for the selected range. Select the *Version name* field and type Last Year, then click *OK*. Repeat the procedure to create versions named Last Year for other ranges, such as Cost of Sales (B4..E4), R&D (B7..E7), and Marketing (B11..E11).

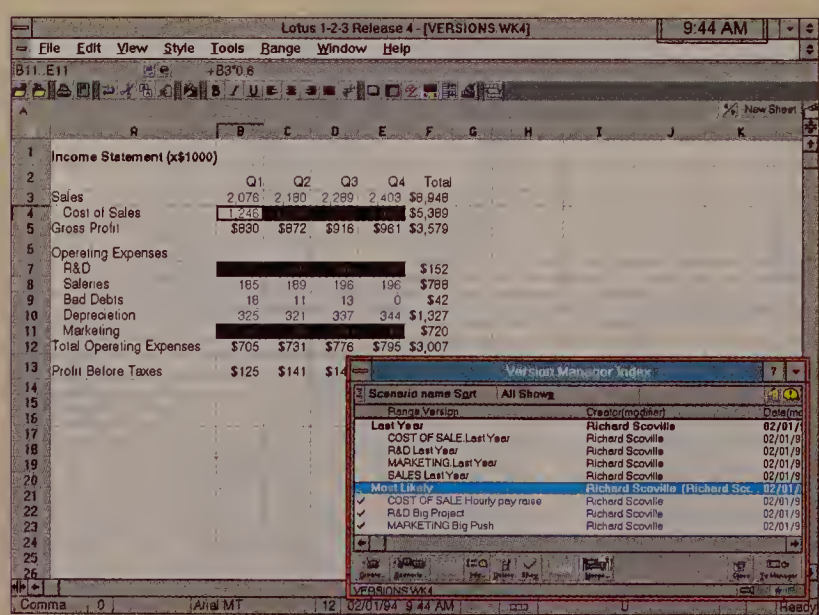

FIGURE 1: WANT TO PLAY WHAT-IF? 1-2-3 4.0's Version Manager lets you create multiple what-if scenarios quickly.

Now you can create versions to capture a variety of eventualities. For instance, if a Korean competitor finishes that new plant, sales might decline: Enter 2300, 2200, 2100, and 2000 into B3..E3, and name the scenario Korean Plant. Depending on the circumstances, you might end up with many versions for Sales and for various expense items. Note that the cells you include in a version may contain formulas. For instance, if you assume that sales will grow 5 percent in the second quarter, you could enter the formula +B3*1.05 into cell C3.

You can restore the values or formulas stored in a version at any time by using the scroll buttons next to the Named range and With version(s) fields in the VM dialog box. Just select the ranges you want to restore. As you experiment, notice that you don't have to change every range for every version. For instance, you could create an Explosive Growth scenario that affects only the Sales range and a Cost of Living scenario that affects only the Salary range.

The Version Manager Index helps you think bigger: It lets you organize versions into scenarios. To access it, click the *To Index* button in the VM dialog box. Arrange the windows on screen so you can see the Index and the spreadsheet together. The Index shows each of the named ranges, with the versions under each one. You can recall a version into a range by double-clicking it in the list. (Click the *Range name Sort* button to note the other sorting options.)

Let's say that the most likely outcome for next year involves the Five Percent version for Sales, the Cost of Living version for Salaries, the Big Project version for R&D, and so on. To create a Most Likely scenario, click the *Scenario* button in the Index dialog box, enter Most Likely into the Scenario name field, and then scroll through the Available versions list. Click on the first version you need for the scenario, <Shift>-click on any other versions, and then click the arrow button to copy them into the Selected versions list. When you're finished, click *OK*.

Notice that the Index now displays the scenario name. Now you can set up additional scenarios. For example, you can create a Last Year scenario to select last year's version for every range, a Best Case scenario that combines a set of optimistic versions, a Worst Case, and so on. My sample worksheet, VERSIONS.WK4, is available on PC World Online (see page 12 for more information).

For a presentation at a managers' meeting, you might use a projection monitor to show your work to best effect. Retrieve your worksheet, call up the Version Manager Index, then just double-click a scenario name to display all the values for that scenario. Double-click again if you want to display or alternate the scenarios. It'll drive them wild.

open the text file, format columns, add column headings, and prepare a chart. But I have had a problem making the macro select just the cells in the current column that contain data. I need to assign these cells to a range name so I can use them as a chart series. When I did this job using 1-2-3, I used the following sequence of macro commands to name just the filled cells in the current column:

{goto}A1~

/rncSERIES1~.{end}{down}~

It's the .{end}{down} sequence I'm trying to duplicate in Excel. Can you help?

[**Editor's note:** The first macro command puts the cell pointer on A1; the second one assigns the range name SERIES1 to just the filled cells.]

Audy Messiua, Seal Beach, California

A Sure. I'll present a macro sequence that does what you asked, but I must first point out that in Excel it's not necessary in order to create a chart. Let's say you have data in cells A1:B100 that you want in the chart. All you need to do is simply select columns A and B in their entirety, then create a new chart document. Unlike 1-2-3, Excel will automatically limit the chart series to the cells that actually contain values. If you want the macro statements to accomplish this task, here they are:

=SELECT("C1:C2")

=NEW(2,2)

=RETURN()

Now for your original question: There are times when you need to select just the filled cells in a column, for instance, if you wanted to build a set of formulas to match a column of numbers or labels. To set up the following example, create a test worksheet that consists of columns of labels. Then choose *File•New*, select *Macro*, and click *OK*. Enter the following macro statements into column A beginning at A2.

=SET.NAME("Top",ACTIVE.CELL()) creates the name Top in the macro worksheet and makes it refer to the active cell in your worksheet.

=SELECT.END(4) moves to the last filled cell in the column—the equivalent of pressing <Ctrl>-<Down>.

=SELECT(Top:ACTIVE.CELL(),Top) selects a range that extends from the active cell now at the bottom of the column of data to Top—the cell at the top of that column.

=DEFINE.NAME("Series1",SELECTION()) assigns the macro sheet name Series1 to the current selection, that is, the column of data.

=RETURN() ends the macro.

Next place the cell pointer on A1 and select *Formula•Define Name*. In the dialog box, enter **Uppercase** into the Name field, click the *Command* button, and enter **a** into the Key field. Click *OK*. When you are ready to execute the macro, place the cell pointer at the top of the column containing entries you want to name and press **<Ctrl>-A**. When the macro is finished with its work, the column of labels is selected and has the name Series1.

By Richard Scoville

Richard Scoville is a contributing editor for PC World *and a software training consultant based in Chapel Hill, North Carolina.* Spreadsheets *welcomes your questions (see page 12 for contact information).* ■

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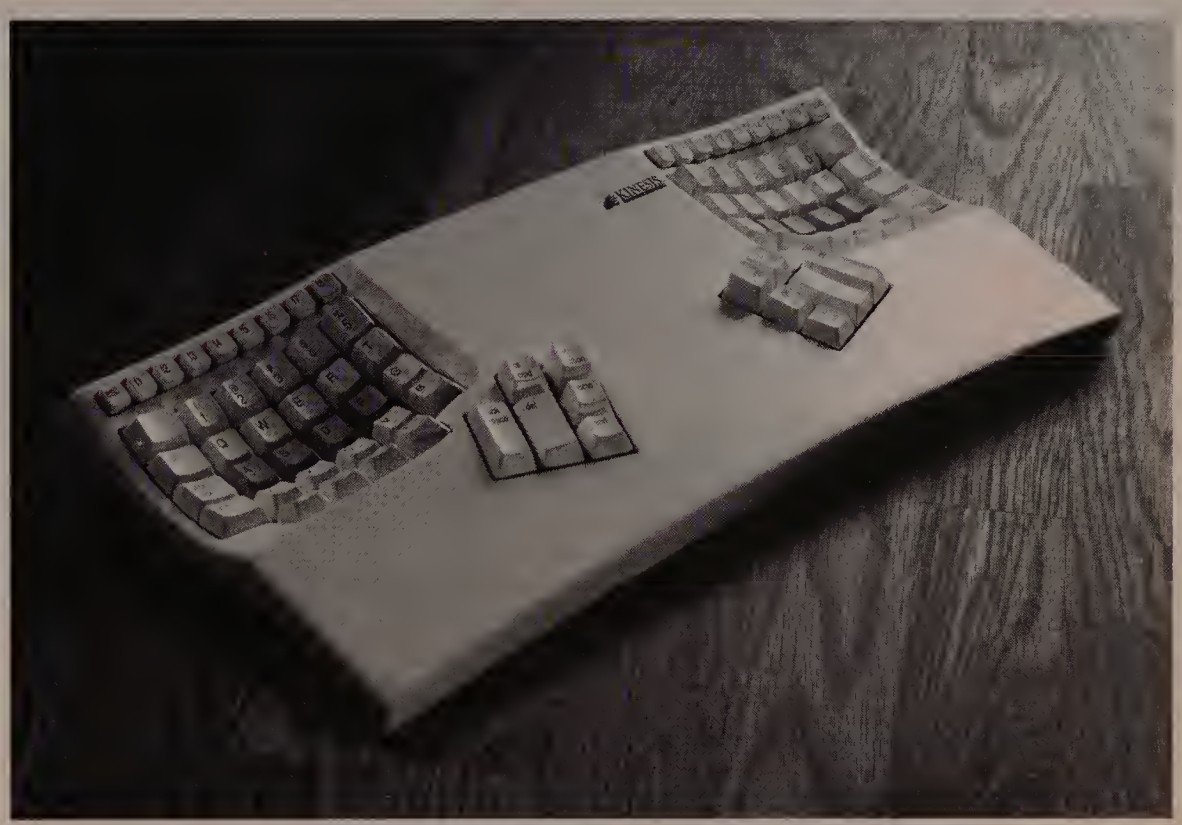

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WORD PROCESSING Q & A

Index Magic in WordPerfect 5.2 for Windows

Q I work on long documents in WordPerfect 5.2 for Windows. These documents require indexes, but it gets tiresome to use the Tools•Mark Text•Index command to mark every item that needs to be indexed in the document. It's especially annoying to repeat this process for the same word or words. It would be much easier to mark a word once and then have WordPerfect find its other occurrences. Is there an easy way to do this?

Erica Jensen, Wilmington, Delaware

A Indexing a long document is a tough job, but WordPerfect can help cut the task down to size. The key is to create a concordance document—a list of words you want to include in the index. When you use the Tools•Generate command to create the actual index, WordPerfect can use the concordance instead of marked text. You can even combine the concordance method with normal index marking in the main document, so you won't have to give up previous index markings. Here's how to proceed.

Start with your main document on screen, then select *File•New* to create a second document to serve as your concordance file. If you wish, use the *Window•Tile* command to make both documents visible at the same time, then resize and position the document windows to suit your needs.

Now, as you type or edit in your main document, add words or phrases to the concordance file using these steps:

1. Highlight the word or phrase in the main document.
2. Press **<Ctrl>-<Insert>** to copy the text to the Clipboard.
3. Press **<Ctrl>-<F6><Ctrl>-<End>** to switch to the concordance document and jump to the end of the list.
4. Press **<Shift>-<Insert><Enter>** to paste the phrase into the list and move the cursor to the next line.
5. Press **<Ctrl>-<Shift>-<F6><Right>** to jump back to your main document and move the cursor out of the text that you highlighted in step 1.

Repeat these steps for each word or phrase you want to index. You need to add a word or phrase only once.

That's a lot of keystrokes, though, so why not record steps 2 through 5 as a keystroke macro with the **<Ctrl>-<F10>** macro recording command? A good shortcut keystroke for this macro would be **<Ctrl>-<Shift>-C**. To use the macro, select the text and then press the shortcut key combination. Once you've added all the entries to the concordance, save the file.

Since most indexes require more than one level of reference, you may need to specify headings and subheadings for your concordance entries. To do this, click inside the concordance's window and highlight the word or phrase you want to use as a heading. Select *Tools•Mark Text•Index*. In the subsequent dialog box (see **FIGURE 1**), you can either accept your highlighted text as the heading or type in a new one in the Heading text box. If you add a new heading, press **<Tab>**. Your original text moves to the Subheading text box, so you can click *OK*.

To sort your index alphabetically, sort the concordance. Position the cursor at the top of the concordance document, then select *Tools•Sort*. The default settings in the Sort dialog box will produce the results you want, so just click *OK*. Be sure to save your concordance file after making any changes.

To use your concordance file, move the cursor to the point in the main document where you want your index to appear, then select *Tools•Define•Index*. Choose a numbering style from the list, then enter your concordance file's file name in the Optional Concordance File text box and click *OK*.

To create the actual index, which should be the last step before you print, select *Tools•Generate* and click *Yes*. WordPerfect will compile and insert the finished index, with page references for every occurrence of each word in your concordance file.

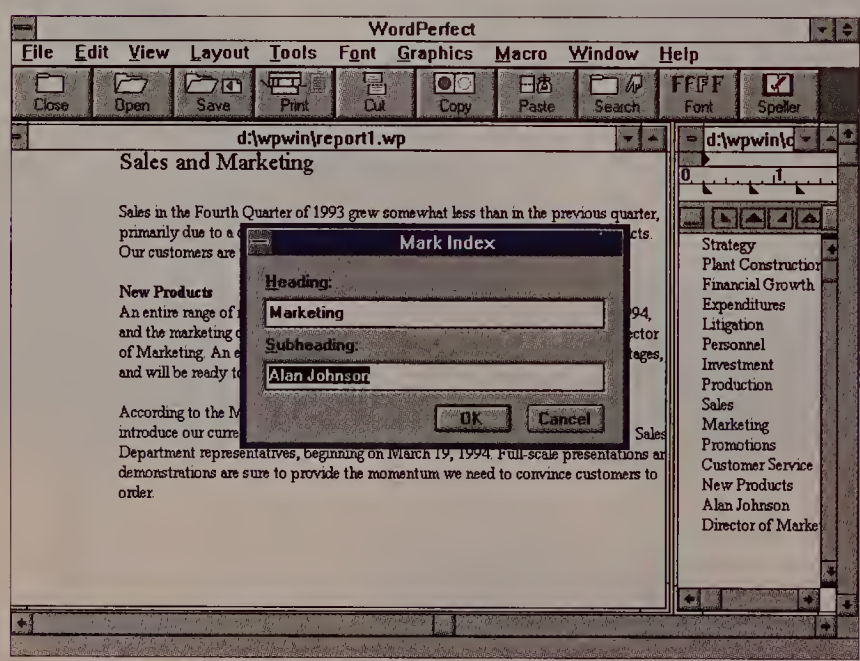

FIGURE 1: USING A CONCORDANCE FILE TO BUILD AN INDEX in WordPerfect is easier than marking individual words; you can still create subheadings with the Tools • Mark Text • Index command.

Listing Specific Files in WordPerfect 5.1 for DOS

Q Many of my text files have the extension TEX. When I call up a directory list using WordPerfect 5.1's <F5> List command, the default prompt offers to list all files (C:\WP51*.*). Is there a way to force WordPerfect to show just my TEX files?

Kevin G. TeBeest, Grand Blanc, Michigan

A Absolutely. The solution is to record a keystroke macro that will display only files with a particular extension. Since you have files with many different extensions, you can record separate macros for each extension you use frequently. Using your TEX files as an example, just follow these steps:

1. To start, press **<Ctrl>-<F10>**.
2. At the Define Macro prompt, press an unused, easy-to-remember **<Alt>-***alphanumeric key* combination. For your

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TEX files, I suggest **<Alt>-T** or **<Alt>-X**. If the key combination is already in use, you'll see a warning. If that happens, press **<Enter>** to stop recording, and then start again from step 1 with a new keystroke.

3. At the Description prompt, type a brief description, then press **<Enter>**.

4. Press **<F5>**, then edit the file specification on the status line to suit your needs. For your TEX extension, just press **<End><Backspace>**, then type **TEX**. When you're done, press **<Enter>**. You'll see the normal File List screen. Press **<Ctrl>-<F10>** to end macro recording, then **<F1>** to return to the normal WordPerfect editing screen.

After recording this macro, you can see your custom file list at any time by pressing the keystroke shortcut. By recording separate macros for each type of file or directory you use, you can make file finding much easier.

Making a Merged List With WordPerfect 5.1 for DOS

Q I have an address list saved as a WordPerfect 5.1 mail merge secondary file. Normally I use this list with WordPerfect's Merge command to create form letters, but I'd also like to use it to create a simple list of addresses for quick reference. I've tried inserting a {PRINT} command in the primary document, but WordPerfect prints each name and address on a separate page. Someone told me I could add a {PAGE OFF} code in the primary document file, but that didn't work either. Can you help me print a simple list?
David Alter, Ellington, Connecticut

A You're on the right track, but you've been stymied by a peculiarity in the way WordPerfect merges files. When you merge secondary and primary files, WordPerfect assumes (a) you want to create a third, merged file, and (b) you want the resulting merged document to have one record (in this case, one address) per page. While you can avoid creating a third, merged file by inserting a {PRINT} command in the primary document (so the merged files go directly to the printer instead of to a third file), you'll still have the one-record-per-page problem. Inserting a {PAGE OFF} command into the primary document won't help, it'll just prevent the printer from issuing an extra blank page between your merged documents.

The solution is to go back to merging your primary and secondary files to a third document rather than to the printer. To do this, remove the {PRINT} command from your primary document. Then insert a {PAGE OFF} (**<Shift>-<F9>P**) command at the beginning of its {FIELD} codes. Be sure to save the primary file before proceeding.

Now, with the altered primary document on the screen, press **<Shift>-<F3>** to switch to a new, blank document. When you want to initiate the merge, press **<Ctrl>-<F9>M**, then type your primary and secondary file names at the prompts or select them from a list after pressing **<F5>**. The merge will proceed, but the results will appear on screen, with no page breaks except at the end of each logical page of names and addresses. After checking the merged document for errors, you can print it using the **<Shift>-<F7>D** command or save the document for later printing.

Quick Font Selection in Ami Pro 3.0

Q I use Ami Pro 3.0 to create some fancy documents. Since I have a list of several hundred fonts to scroll through, changing text to a different font can be a chore. Even though I use the typeface button on the status bar (which is much faster than using the Text•Font command in the menu), scrolling through the whole list is still a pain. Is there a shortcut?
Laura Gallup, Crystal, Minnesota

A Yes indeed, one that works not only in Ami Pro but in any Windows application that uses list boxes. Anytime you have a list box on screen and an item in the list is highlighted, pressing a letter key will jump you to the first item in the list beginning with that letter. For example, to switch from Arial to Times Roman in a font list box, just press **T** and, if you need to, scroll down the list to Times Roman.

Unfortunately, when you press *T* in Ami Pro and some other Windows applications, the first font beginning with *T* appears at the *bottom* of the list box—the other fonts beginning with *T* are still off screen below it. If you need to see one of the fonts that isn't visible on screen, just type the *next* letter of the alphabet; for example, to display fonts starting with the letter *T*, type **U**. The first font starting with the letter *U* will appear at the bottom of the list box, and the fonts beginning with *T* will be listed above it.

Moving Pictures in Word for Windows

Q After I import a graphics file into a document using Word for Windows 2.0's Insert•Picture command, I can't seem to move it around on the page by dragging it with the mouse. I'm sure this is possible, but I can't make it work. What's the answer?
Eric Waddell, Sioux Falls, South Dakota

A Actually, it's pretty easy to move graphics around on the page in WinWord. You're just missing a couple of steps. The program assumes that a graphic added with Insert•Picture belongs in the text, anchored at the point in the text where you inserted the image. While that's useful at times, users more commonly want to place a graphic at a fixed position on the page.

To do this, you need to put a frame around the image. First, make sure you're in WinWord's Page Layout view: Select *View*, then *Page Layout*. Next, select the image by clicking on it; you'll know it's selected when several small black squares surround it. Select *Insert•Frame* to add a frame around the image. Then you can move and resize the image by manipulating the frame.

If you know you'll want a movable image from the start, you can select *Insert•Frame* and draw a frame on the screen where you want the image. Then, with the cursor inside the frame, select *Insert•Picture* to place your graphic inside the predrawn frame.

By George Campbell

George Campbell is a contributing editor for PC World. Word Processing *welcomes your questions (see page 12 for contact information).*

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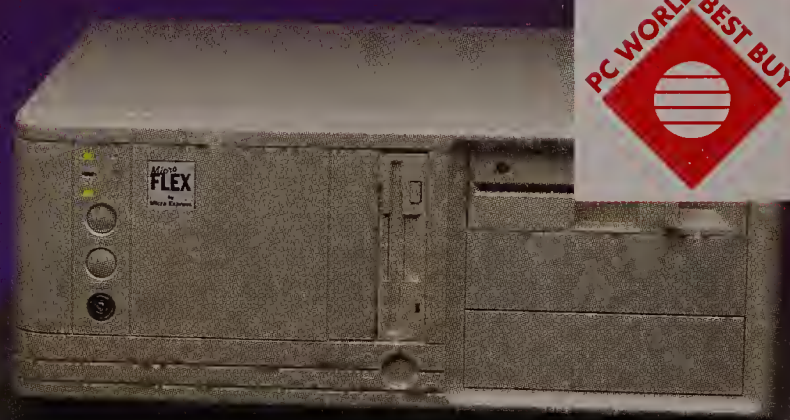

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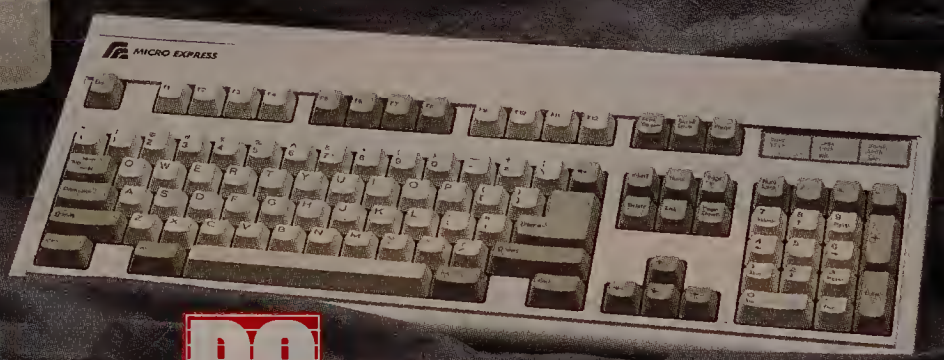

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WINDOWS Q & A

In a TIFF Over DoubleSpace

Q Like most folks who use Windows-based desktop publishers, I have many TIFF images. To save disk space, I usually compress them (via a graphics or scanner program) using various TIFF compression schemes. But I just got DOS 6.0 and want to compress my hard disk with the DoubleSpace utility. Should I uncompress all my TIFF images and let DoubleSpace do the work?
Maxine Kurtzman, Knoxville, Tennessee

A No. In most cases, the TIFF compression offered by your graphics programs is far more efficient. DoubleSpace won't interfere with proprietary TIFF compression—it just won't help it much. In short, DoubleSpace can't really compress a file that has already been compressed.

In fact, DoubleSpace can't squeeze *uncompressed* TIFF images much either. DoubleSpace is a general-purpose utility designed to handle the universe of file formats, and image files aren't high on its list. DoubleSpace might compress your TIFFs by 1.4 to 1, and that's about it. But with compression schemes optimized for TIFF-formatted files, such as PackBits and JPEG, compression is often 10 to 1 and sometimes much higher. Better still, many desktop publishing programs can read compressed TIFFs directly, eliminating the need for manual conversion.

Of course, how much compression you get depends on the image in question and the graphics program you're using. For example, CorelDraw, which can export TIFFs using PackBits compression, can squeeze an 800K 300-dot-per-inch, 256-gray-scale image into 180K; lower the resolution to 150 dpi, and you can pack the same image into 80K. PaintShop Pro, a popular shareware package that relies on the LZW scheme, won't do as well—it shrinks the same file to only 622K.

But use the same programs to compress a 600K black-and-white line-art image, and PaintShop Pro is the champ, cramming the image into a 40K file, while CorelDraw needs at least 85K. So pick the right compression technique for the job. PackBits is especially good at compressing most gray-scale and halftone images (like scanned photos), LZW is best for simple black-and-white line art, and JPEG (found in high-end programs such as Adobe Photoshop) should be used for heavy-duty scanned color images.

Just make sure your desktop publishing program is compatible with the TIFF compression technique offered by your graphics program. And remember, too, that some compression options sacrifice data—resolution, colors, and more—to pack a huge file into a tiny space. But no matter what you use, DoubleSpace shouldn't get in the way.

Windows Toolbox

✓FREEWARE Ever try to paste something from the Clipboard, only to find what you want isn't there anymore? Wish you could copy data from different sources and append it to the Clipboard for later pasting? Take a look at Doug Overmyer's UltraClip 1.7, a terrific freeware program that extends the Clipboard dramatically. You can save Clipboard contents to disk automatically anytime you do a new cut or copy; view thumbnails of each clip for quick retrieval; and create clips from BMP, PCX, GIF, and WMF images stored on disk. UltraClip is free, although Overmyer will send you the current version for $7.50. You can download it as UCLP17.ZIP from PC World Online (see page 12 for information), or contact Overmyer via CompuServe at 71021,2535.

Terminal Answering

Q Is there any way to make Windows' Terminal program answer the phone so I can receive calls from other computers? And can Terminal simulate a host mode?
G. L. Sebring, Miami, Florida

A Terminal lacks a host mode, which lets a remote user access your computer, transfer files, and so on. But you can force it to answer the phone by typing in the appropriate Hayes command. Unfortunately, you have to be there, ready to give the command, when the phone rings.

When that happens and you want Terminal to answer, type **ATA0** in the Terminal window and press **<Enter>**. Your computer will be connected to the calling computer. You can then use Terminal functions to perform any necessary tasks, such as transferring files.

Easy Listening

Q I sell PCs with CD ROM drives and Windows preloaded. Sometimes I want to demonstrate to customers that a CD ROM drive, along with some audio hardware, can also play music CDs. Can you recommend a quick and simple program for playing CDs?
Garth Stinson, Fort Wayne, Indiana

A There are many cheap, capable programs that play audio CDs on a CD ROM drive, but why bother? The Media Player accessory included with Windows 3.1 does the job for nothing. Before you start Windows, load MSCDEX.EXE, a TSR that comes with DOS 6.*x* and with most CD ROM drives (if you do this a lot, you may want to add it to your AUTOEXEC.BAT file). Once you're in Windows, open the Accessories group, and double-click the

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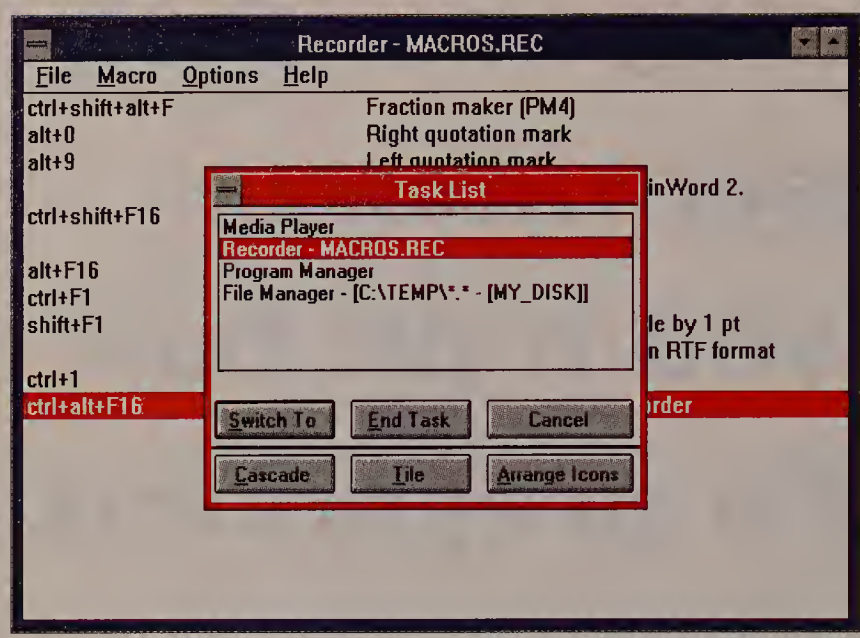


MACROS CAN CLOSE RECORDER via Windows' Task List. Simply direct the macro to press R, then <Alt>-E to exit Recorder.

Media Player icon. (If the icon isn't present, run MPLAYER.EXE in the WINDOWS subdirectory.) Select *Device•CD Audio* and press **<Ctrl>-P** to play the CD. To pause playback, press **<Ctrl>-P** again or **<Ctrl>-S** to stop.

(If CD Audio isn't on the menu, the appropriate drivers aren't installed. Double-click *Drivers* in the Control Panel, select *Add•[MCI] CD Audio•OK*, slip the requested Windows program floppy into the appropriate drive, and click *OK*. Click *Close*, and you should be ready to roll.)

It you hate futzing with the menus, you can automate the process with a Recorder macro and make beautiful music with a keystroke combination. Here's how:

First, assign a shortcut key to the Media Player icon. Select the icon, then *File•Properties;* next enter a choice such as **<Ctrl>-<Alt>-P** on the Shortcut Key line, and click *OK*. Return to the Program Manager, launch Recorder, and choose *Macro•Record*. Supply a macro name, and assign a macro Shortcut Key that won't conflict with other applications, such as **<Ctrl>-<Shift>-<Alt>-<F12>**. Set 'Playback' to *Same Application*, 'Speed' to *Fast*, make sure Enable Shortcut Keys is checked, and set 'Record Mouse' to *Ignore Mouse*. Click *Start*, and you're recording.

Press **<Ctrl>-<Alt>-P** to launch Media Player, then **<Alt>-DC** to trigger CD Audio mode. Press **<Ctrl>-P** to play the CD. Press **<Alt>-<Space>N** to minimize Media Player and keep it out of your way.

To stop recording, press **<Ctrl>-<Break>**. Select *Save Macro* from the Recorder dialog box, then use **<Alt>-<Esc>** to return to Recorder. Select *File•Save as* and save the macro to disk.

To play the macro (and your CD), simply load Recorder, open the appropriate macro file, and go about your business. When it's time for a demo—even from within a Windows application—just press the macro hot-key combination **<Ctrl>-<Shift>-<Alt>-<F12>**. If you want to pause or stop playback, change tracks, and so on, you'll have to display the Media Player.

To launch your macro from an icon, perform the steps in the following tip. Party on, Garth.

Self-Terminating Macros

Q Can you run a Recorder macro from an icon? More important, can you create a macro that shuts down Recorder when it's done?

Patrick Mann,
Albuquerque, New Mexico

A You bet. Doing the former requires a parameter or two; the latter involves a simple trick with the Task List.

To attach an icon to a macro, select *File•New•Program Item* from the Program Manager and click *OK*. In the Command Line text box of the Program Item Properties dialog box, type **recorder –h** *keystroke FILENAME*.**REC**, where *keystroke* is the keyboard shortcut assigned to the macro and *FILENAME* is the Recorder file containing it. When entering the keystroke, use **^** for <Ctrl>, **%** for <Alt>, and **+** for <Shift>; for instance, you'd use **^%F10** to represent <Ctrl>-<Alt>-<F10>. Supply a title in the Description text box, click *OK*, and a Recorder icon will appear. Double-click the icon, and your macro takes off.

To create a macro that closes Recorder automatically when it's done, you'll have to record it a bit differently.

Double-click the Recorder icon and select *Macro•Record*. Specify a macro name, a shortcut key, and other particulars in the Record Macro dialog box. Click *Start* to begin recording. Perform all the steps you want to capture, then press **<Ctrl>-<Esc>** to open the Task Manager. Press **R** to move the selection to the Recorder line, then press **<Alt>-E** to trigger the End Task button. Select *Save Macro* from the Recorder dialog box, then use **<Alt>-<Esc>** to return to Recorder. Save the macro to disk using *File•Save as* and exit Recorder. To attach the macro to an icon, follow the procedure outlined previously.

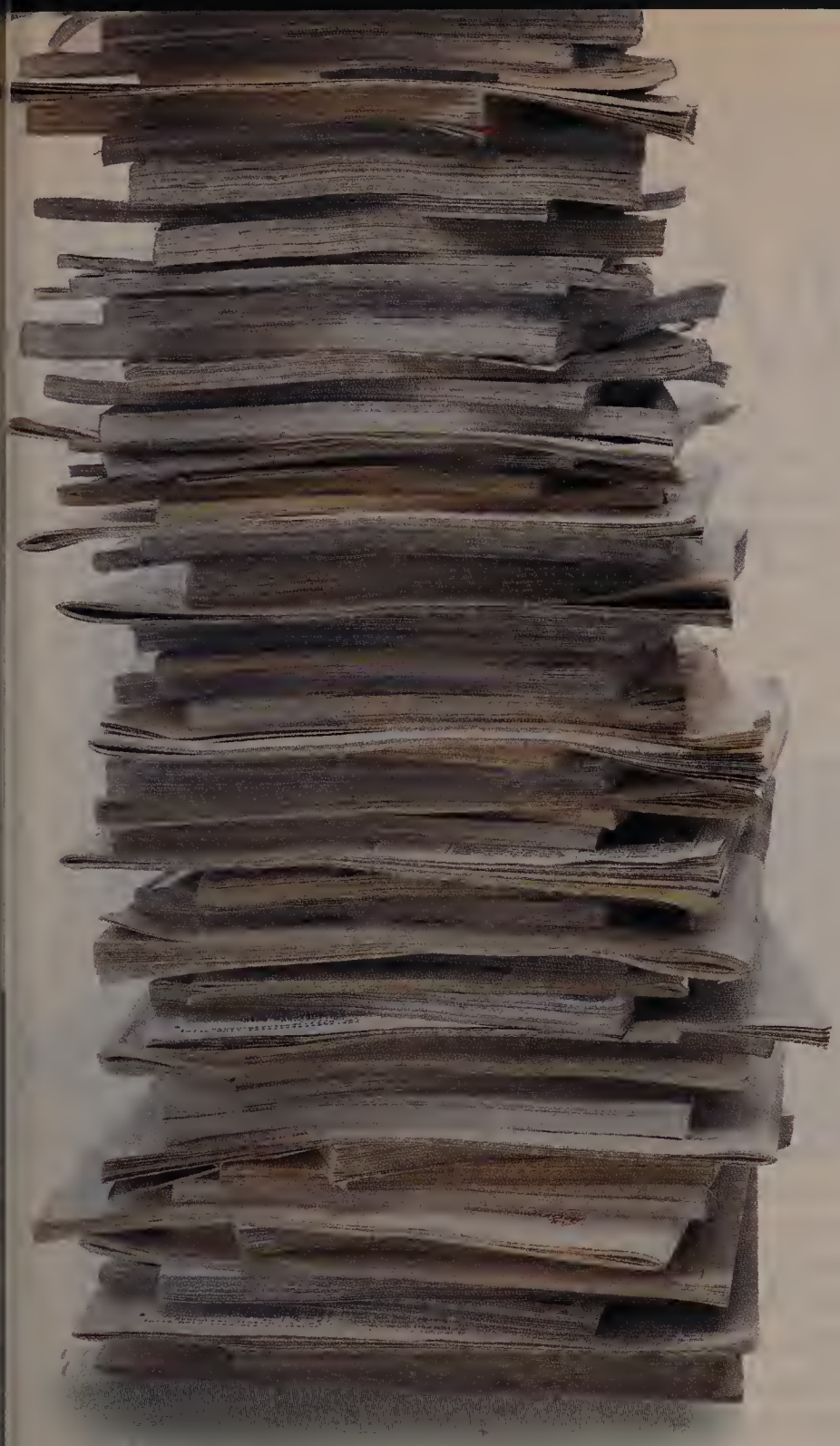
Now when you double-click your macro icon, the macro will execute and finish by terminating the only program beginning with an *R* in the Task List—the Recorder.

As you may have guessed, this system is hardly foolproof: If you're running other programs whose window titles begin with *R*, the technique may fail. With a conflicting DOS application, the solution is to rename the program's icon. Just click the icon, select *File•Properties*, and change the icon's name in the Description line to something that doesn't start with an *R*.

Changing the name of a Windows application is tougher, since the name is embedded in the program's executable file. The steps: Make a backup copy of the relevant EXE file, then open the EXE file in Write. Click *No Conversion* when prompted, then *Find•Replace*. In the Find What text box, enter the program name as it appears on the title bar (such as "Paintbrush"); in the Replace With box, type a new name with exactly the same number of characters but with a different first letter (such as "Baintbrush"). Click *Replace All*, then *Close*, and save the file. It ain't a pretty solution, but it works.

By Scott Dunn

Scott Dunn is a contributing editor for PC World *and coauthor of* 101 Windows Tips *(Peachpit Press, Berkeley, California, 1992).* Windows *welcomes your questions (see page 12 for contact information).*



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OS/2 Q & A

Me and My Shadow

Q Some of the icons on my desktop have black text and some have gray text. Why the difference?
Steve Jystad, Rochester, Minnesota

A The icons with black text are original desktop objects. The ones with gray text are *shadows*. A shadow is a linked copy that effectively gives you an object that's in two places at once; any settings you change in the original are reflected in the shadow and vice versa. You create a shadow of an icon by holding down **<Ctrl>-<Shift>** while right-dragging the icon from one folder to another.

Suppose you want the Sticky Pad app, which resides in the Productivity folder, to start up every time you boot OS/2. To do so, it must be in the Startup folder. To get it there, you can move it, copy it, or create a shadow of it.

Moving's the simplest method: Right-click-and-drag the icon into Startup. But what if you decide later to change some of Sticky Pad's settings? You can't find it in the Productivity folder, and only after a panic attack do you remember that it's now in Startup. Wouldn't it be easier to have it in both places?

So you copy the Sticky Pad back to the Productivity folder by holding down **<Ctrl>** while you drag the icon to Productivity. Now you have Sticky Pad icons in both folders. Blissfully, you change the settings for Productivity's Sticky Pad—you open its Settings notebook to the Window page and tell it to minimize to the desktop.

But the next time you start OS/2, Sticky Pad isn't minimized to the desktop. You now have two different Sticky Pad objects; one in the Productivity folder and another in the Startup folder. And setting the attributes for one of them doesn't do a thing for the other.

The best method is to have the same object in two places at once—you want a shadow. After deleting the copy in the Startup folder, hold down both **<Ctrl>** and **<Shift>** while right-dragging Productivity's Sticky Pad icon to Startup. The original object will have black text and the shadow will have gray text.

Now any changes you make to the Sticky Pad object in Productivity will be reflected in the Sticky Pad shadow object in Startup. In fact, when you start either of them, *both* icons will show the background slash marks that indicate a running program. They represent one and the same object, just displayed in two different places.

Installing Multimedia Support

Q I'd like to use OS/2's multimedia capabilities. But after installing the operating system, I don't see anything that lets me play OS/2's video clips. Did I do something wrong?
Janet Lunkenheimer, Cincinnati

A No, you didn't. IBM planned originally to sell OS/2's multimedia extensions separately. Although they were eventually bundled with the system, they still have their own installation program.

Luckily, the installation is easy to perform. Among the floppies that came with OS/2, look for the two (three if you have the 5 ¼-inch version) named Multimedia Presentation Manager/2. Insert the first of these disks into your floppy drive, then open the Drive object corresponding to that floppy and double-click the icon titled *MInstall-.Exe*. This procedure will start the installation program; you can just follow the prompts from there.

By Lou Miranda

Lou Miranda is an OS/2 programmer and consultant based in Minneapolis/St. Paul. OS/2 welcomes your questions (see page 12 for contact information).

From Windows to OS/2

Customizing the WorkPlace Shell

In Windows, you change screen colors through the Control Panel. In OS/2, right-click on any open space on the desktop to bring up the desktop menu; then just select System Setup, and the options are in front of you.

System Setup is where you change your mouse settings, desktop colors, and desktop fonts. To change colors, you double-click Scheme Palette, then click on on any of the available desktop schemes.

After making your changes, close the Edit Scheme dialog box. Now hold <Alt> and right-drag the scheme you just modified to the desktop. Let go of the mouse button before you release <Alt> and your entire desktop changes to match the scheme.

The <Alt> key tells OS/2 that you want to change the look of your entire desktop. You can also change individual objects, such as folders and windows, without affecting the rest of your desktop. Simply drag a scheme to an object and drop it—without holding down the <Alt> key.

USER GROUP TIP

OS/2 Work Folders to the Rescue

I'm often managing multiple projects at one time, and I like to keep all files and applications relevant to a project together. I use OS/2's work-area folders because they let me group together related objects, but these folders have two particular features that make them even more useful for working on multiple projects. First, when you close a work folder, all the objects in the folder automatically close. Second, when you hide the window of a folder, all the windows inside that folder are automatically hidden. Open a work folder, and the windows in the folder are displayed in their previous view. When you minimize a folder, the icon for the folder is displayed, but you won't see any sign of its objects on the desktop.

Bill Schindler
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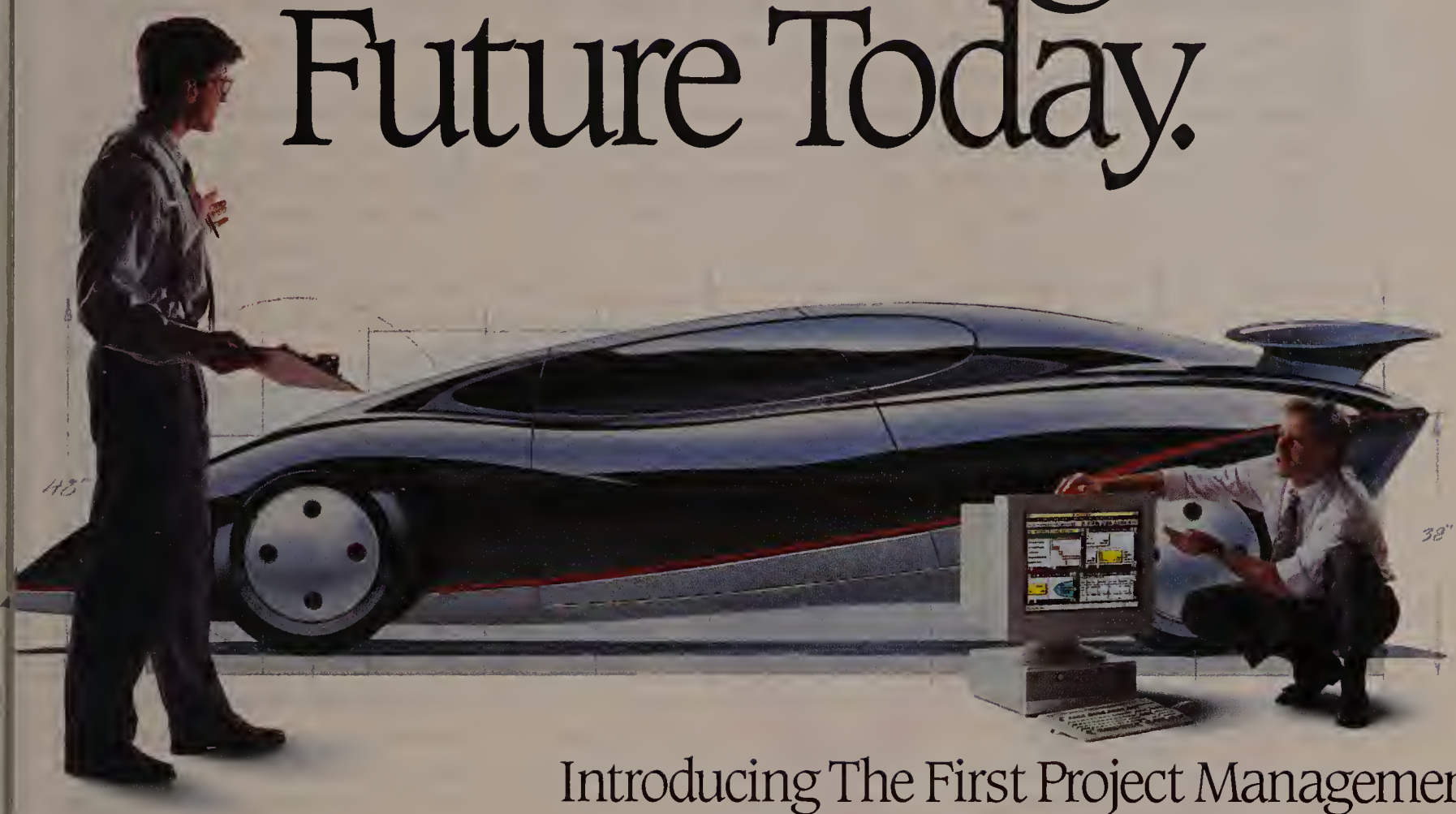

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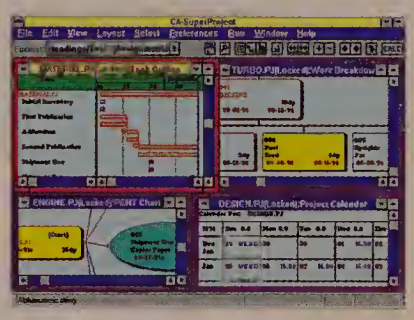

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DATA MANAGEMENT Q & A

Double-Checking Deletes in Paradox for Windows

Q I recently switched from the DOS version of Paradox to Paradox for Windows. With the old version, I used a script to protect me from accidentally deleting a record when I pressed <Delete>. The script asked me if I really wanted to delete a record and proceeded only if I told it to. Is there something I can do in Paradox for Windows to get the same effect? Even though you must press <Ctrl>-<Delete> rather than plain <Delete> to get rid of a record in the new Paradox, I'd still like an extra safeguard built in.
Amanda Sterling, Stamford, Connecticut

A With Paradox for Windows, you can add a *method* to a form that will prompt you for confirmation when you try to delete something. A method is a group of commands in ObjectPAL, the Paradox for Windows programming language. It's easy to write a method to attach to a form.

Start by selecting *Properties • Desktop* and setting the ObjectPAL level to Advanced. (Don't worry, this doesn't complicate the task at hand; it just makes the command you need available.) In Design mode, open the form you want to use for editing your table. Then right-click the title bar for the form window, and from the resulting menu, select *Methods*. In the resulting dialog box, double-click *keyPhysical* under 'Built-in Methods'. This will open the ObjectPAL editor.

Paradox will automatically create a skeleton of the commands you need in a keyPhysical method. Edit these commands to look like the method in **FIGURE 1** (you can change the warning message between the quotes if you like), then use *Language • Check Syntax* to make sure you've entered it correctly. Or you can download the method from PC World Online as an ASCII text file called CKDELETE.MTH (see page 12 for information). You can insert this file into the ObjectPAL editor through the clipboard. Once you've created the method, close the editor window to return to the Form Design window.

```
method keyPhysical(var eventInfo KeyEvent)
 var
  myChoice          String
 endVar

if eventInfo.isPreFilter()
 then
   if eventInfo.vChar() = "VK_DELETE"
    then
     disableDefault
     myChoice =
     msgYesNoCancel("Warning","Delete this info?")
     switch
     case myChoice = "Yes"     : enableDefault
     case myChoice = "No"      :
     case myChoice = "Cancel" :
     endSwitch
   endif
 else
endif
endmethod
```

FIGURE 1: FOR DELETE PROTECTION in Paradox for Windows, use this method to intercept the <Delete> key.

To test your "safety net," press **<F8>** or click the *View Data* SpeedBar button. Then press **<F9>** to go into Edit mode and try to delete a record with **<Ctrl>-<Delete>**. You should see a warning dialog box with the choices Yes, No, and Cancel.

Paradox will show you this warning anytime you press <Delete> while editing in that form. So besides making it harder to delete a record, this will give you a chance to save a field's value if you press <Delete> with the field highlighted. On the other hand, if you use the Field View option to edit a field, you'll have to go through the dialog every time you try to delete a character. To avoid this bother, just use **<Backspace>** instead of <Delete> to remove any individual characters.

Adding IDs to a Paradox Table

Q After I entered several hundred records into a Paradox 4.0 table of survey data, I discovered that I needed a field with a unique ID number for each record. Is there a quick way to make Paradox number the records that are already in the table?
Sally Birne, Portland, Oregon

A Yes, there is. First, use the *Modify • Restructure* command to create a new number field called **ID**. The field doesn't have to be called ID, but the instructions that follow assume that it is. Once the field is created, press **<Alt>-<F10>**, select *Miniscript*, and enter **COEDIT "*table*" SCAN [ID] = RECNO() ENDSCAN DO_IT!**, substituting the name of your table for *table*, but keeping the quotation marks around it. This will put the record number in the ID field for every existing record in your table.

You can also set up a hot key to put the record number in new records as you enter them. To assign <Ctrl>-N, enter **SETKEY 14 [ID] = RECNO()** as a miniscript before you start your data entry (14 is the ASCII code for <Ctrl>-N). Or add this line to an ASCII text file called **INIT.SC** in the Paradox directory (you may have to create it) to set up the hot key every time you load Paradox.

Printing Today's Records With Access

Q I work in the customer service department of a medium-size company. For each phone call we receive, we enter information into an Access database, dating each new record. What is the best way to print letters at the end of the day for just that day's calls?
John Kelly, Los Angeles

A An easy way to print your letters is with a report based on a query that selects the day's calls. The first step is to create and save the query. Then you

can design a report, possibly with the help of Report Wizard, that will print a letter for each record the query finds.

To create the query, highlight *Query* in the Database window and click *New*. In the Add Table dialog box, highlight the name of your call information table, click *Add*, then *Close*. When the query window opens, drag the fields you want in your letter from the field list to the query image at the bottom of the window, bringing each to a different column. Whether you want to include the date field or not, drag it into a column. Then enter **=Date()** in the Criteria row for the date field column. That's it; your query is done. Select *Query•Run* to make sure it's working. When you're satisfied that it is, close the query window, save your changes, and enter a name like **Today's Calls** when prompted.

Now it's time to create the report for printing letters. In the Database window, click *Report*, then *New*. In the resulting dialog box, select *Today's Calls* (or whatever you named the query) as the basis of the report, and then click Blank Report or Report Wizard, depending on whether you want to design the report from scratch or not. Go ahead and design your report, selecting and laying out fields the same way you would for a report based on a table.

When you use your new report, it will print letters only for the records with the current date in the date field.

Search and Replace With FileMaker Pro

Q I use FileMaker Pro to store all sorts of information for my small business. Once in a while I need to make the same change in a particular field in several records. I've seen the Replace command on the Edit menu, but no matter what I try, it's always dimmed. Can you enlighten me, please?
Roy Baptiste, Dallas

A The Replace command is the one you're looking for. The problem is that it's available only when you have a field selected. Here's how it works.

First use *Select•Find* to narrow down the records to the ones you want to change. You'll get a blank form, where you should type in the appropriate values you want to use for selecting records—say, enter **TX** in the state field to make changes only for people living in Texas—and press **<Enter>**. If you check the Browse Status Area on the left side of the FileMaker Pro window, you'll see how many records were 'Found'. If you page through the file, these are the only records you'll see.

Once you have selected the records you want to affect, click the field you want to change. Type the new value for the field and select *Edit•Replace*. You'll get a dialog box that lists the number of records that will be changed, as well as the name of the field that will be affected and the new value. If you want to go ahead with the change, just click *Replace*.

By Celeste Robinson

Celeste Robinson is a contributing editor for PC World *and the author of* The Paradox 4.0 Handbook *(Bantam Computer Books, New York, 1992).* Data Management *welcomes your questions (see page 12 for contact information).* ■

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PUBLISHING & PRESENTATIONS Q & A

Sound Off With Freelance

Q Since adding a sound board to my PC, I've used Freelance Graphics for Windows 2.0 to produce screen shows with sound effects that are cued to particular slides. Now I'd like to add sounds that I can play manually by clicking on clip art such as a computer, a clock, and a group of people that I've included in different slides.

Margie Rosenthal, Bellport, New York

A Playing sound files by clicking on graphic objects is great for interactive presentations. The basic procedure is twofold: First you set up a graphic as a Freelance screen show button, and then you assign a sound file to it. After that, you can play the sound file just by clicking on the graphic.

To explain the steps required, we'll use a clip art symbol and a WAV sound file that come with Freelance. But you can also apply this technique to other graphics you create or import, as well as WAV sound files from other sources. In this example, we'll take a graphic of a telephone and make it ring when you click it. Here's how.

1. Click the Symbol icon (the light bulb) in the Toolbox to open the Add Symbol to Page dialog box. Choose a symbol category by scrolling to and highlighting *communic.sym*. Choose a symbol by highlighting the telephone symbol displayed below, and click *OK*. By default, Freelance inserts the symbol on the left side of the slide, but you can move or resize it easily.

2. With the telephone still selected (indicated by the highlight boxes that surround it), choose *View • Screen Show • Create/Edit Button*.

3. In the dialog box that appears, you can accept or replace the default entry for the *Screen show button name*. In this case, you might replace the default with 'Telephone' to help distinguish it from other buttons on the same slide. Next click *Play a multimedia object* for the Specify button behavior option, and click the *Browse Media* button.

4. In the Lotus Media Manager dialog box that appears next, click the *Files Types* list box and choose *WAV Files*. These files should be in the \LOTUS-APP\MULTIMED directory; if the files in this directory aren't displayed, use the Directories path box to change to that directory. Highlight the file *PHONE.WAV*, and click *OK* twice to return to the slide.

That's all there is to it. To test the sound effect that you've added, click the *Screen Show* (movie camera) icon in the button bar to start the screen show. When the slide with the telephone symbol is displayed, click on it to make it ring. To advance to the next slide or return to the slide window, just click somewhere off the symbol.

ADD BUTTONS TO FREELANCE SCREEN SHOWS and then assign sounds or video clips to them.

You can use any Freelance symbols as screen show buttons. You can associate sounds with graphic objects created with Freelance's drawing tools, with a chart or table, or with imported graphic files, such as scanned image files. Just select the object first, then follow the steps discussed previously.

Last but not least, once you've set up a graphic object as a button, you can reconfigure it by clicking the right mouse button and selecting *Button Attributes* from the pop-up menu to reopen the Create/Edit Screen Show Button dialog box. You could, for example, assign different sounds to the symbol, or specify the number of times it should sound each time you click on the symbol.

Easier Drop Caps With PageMaker

Q PageMaker 5.0's automatic drop-cap feature is a welcome improvement over the old method of manually formatting a big letter at the beginning of a paragraph. But after applying it, I still have problems if I want to make other changes to the same paragraph. For example, if I edit the text or change the column width, the text no longer wraps properly and I have to remove the drop cap and start over. What gives?

Bill Alexander, Nashville

A Although PageMaker's "Drop cap" addition certainly makes it faster to format large capital letters, it still isn't foolproof, as you've discovered. The reason you're having problems is that the Drop cap addition inserts tabs to create the space around the big letter and adds line breaks to wrap the text around it; any modifications you make to the paragraph afterward can foul up the formatting. That's why the basic rule of thumb for using this addition without trouble is, don't mess with it after you've applied it.

However, you can avoid most potential pitfalls if you follow a few useful pointers when using this otherwise handy typographic effect. (Note: If you didn't install the Drop cap addition when you installed PageMaker, run Aldus Setup, select *Additions*, click *Setup*, and select *Drop cap*.)

First, don't use the Drop cap addition until your publication is almost final. It's best to finish adjustments to the layout, such as column width and alignment,

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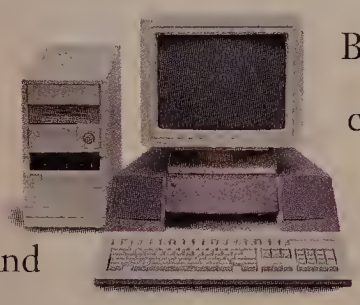

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and changes to the text, including editing and spell-checking, before adding a drop cap. If you want the drop cap to use a different typeface or type style than the rest of the paragraph, set those specs *before* you use the Drop cap tool.

To add a drop cap to a paragraph, insert the text cursor in the paragraph and select *Utilities•Aldus Additions•Drop cap* to open the Drop cap dialog box. The default size for a drop cap is three lines, but you can change the size if you wish. Finally, click *Apply* and then *OK*, or click *Prev* or *Next* to apply additional drop caps.

If you must make changes to a paragraph after applying a drop cap, the safest method is to use the Drop cap utility to remove the existing drop cap, then make the necessary changes, and finally reapply the drop-cap effect. To remove a drop cap, insert the text tool cursor in the paragraph, select *Utilities•Aldus Additions•Drop cap*, then click *Remove* and *OK*.

A final tip: You can apply a drop cap only to text that uses either Proportional or Baseline leading. If you try to apply it to text that uses Top of caps leading, you'll get an error message. To change a style's leading method, select *Type•Define styles*, highlight the style name, and press **<Alt>-EPS** to open the Spacing attributes dialog box. Click on the button for the leading method you want, and press **<Shift>-<Enter>** to close all the dialog boxes and return to your page.

PowerPoint Handouts by the Numbers

Q I'm combining two existing PowerPoint 3.0 presentations, each containing 30 slides, into a single slide show. To accompany the combined show, I want to print a single set of handouts, three slides per page, with consecutive page numbers. While PowerPoint correctly prints the first set of handouts with page numbers 1 through 10, it assigns the same page numbers to the second set of handouts as well. How can I get the second set to start on page 11?
May Sui, San Francisco, California

A All you need to do is change the starting slide number in the second presentation. PowerPoint will then change the page numbers on the handouts accordingly. In this case, you'll want the second presentation to begin with slide number 31.

To do this, open the second presentation and select *File•Slide Setup* to open the Slide Setup dialog box. In the Number Slide From box (which displays '1' by default), type **31** and then click *OK*.

You can now print the second set of handouts using the same print options you applied to the first presentation. PowerPoint will automatically calculate and print the consecutive numbers needed for the handout pages, beginning with page 11. To combine more than two presentations, repeat the same procedure and change the slide number default as necessary for each additional presentation you want to include.

By Richard Jantz

Contributing Editor Richard Jantz is an electronic publishing and presentations consultant in Berkeley, California. Publishing & Presentations *welcomes your questions and make-over candidates. See page 12 for contact information.* ■

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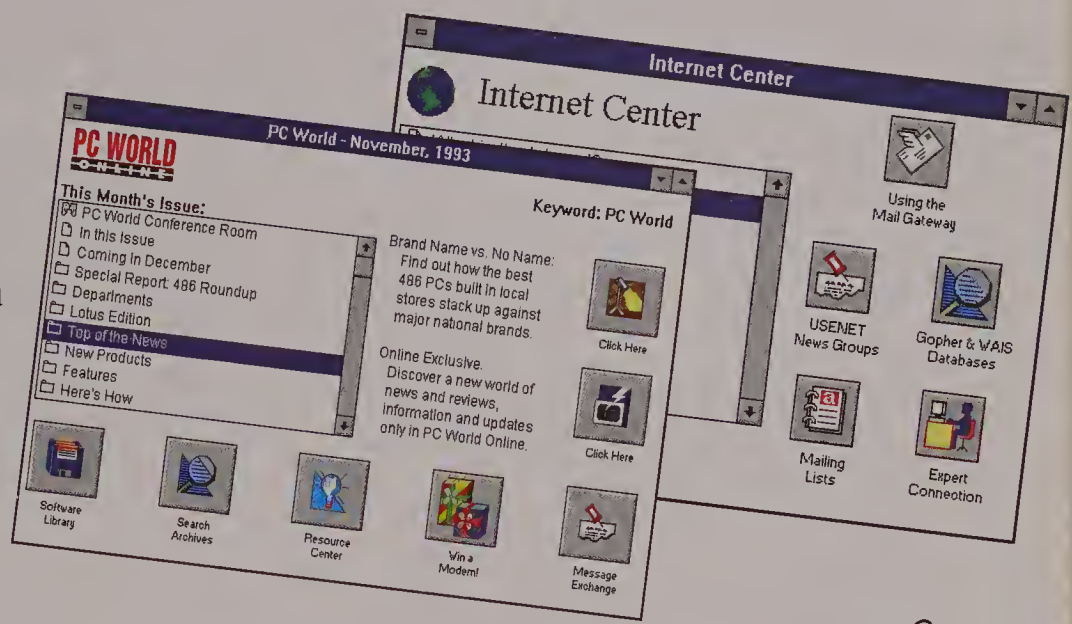

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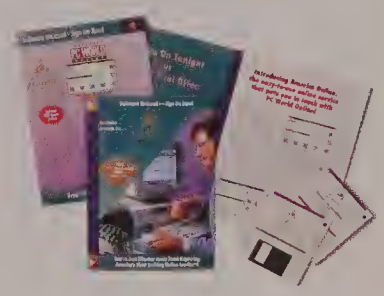

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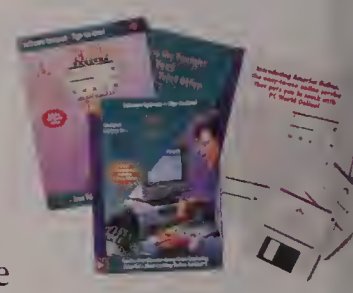

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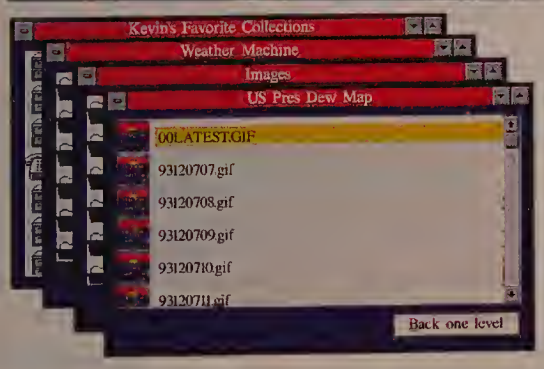

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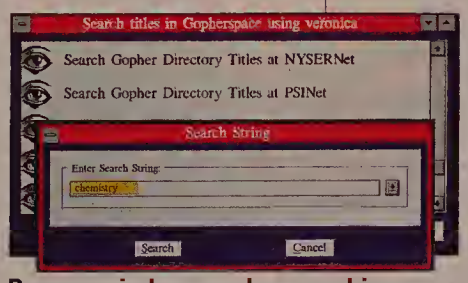

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COMMUNICATIONS Q & A

Getting Your V's

Q I am in the process of buying a modem and am confused by the protocols listed in the ads. There seems to be an abundance of V-somethings with V-something-bis attached to each. Also, what do the MNPs mean?
Chi-Hua Chien,
Rancho Palos Verdes, California

A In the world of modems, you can never have too many silly acronyms. Here's what it all means:

- **MNP** Stands for Microcom Networking Protocol, an error-control and data-compression scheme designed by modem maker Microcom Systems. Most modems include it. The protocol has ten steps, MNP 1 through 10. MNP 1, 2, and 3 alone are obsolete; MNP 4 covers error control; and MNP 5 adds compression. Each step is backward-compatible, so MNP 5 includes MNP 1 through 4. While you may see references to higher MNPs, they aren't often found on modems; MNP 10, for example, covers cellular communications.
- **V.22** The modulation scheme for 2400-bps modems set by the CCITT (Comité Consultatif International Téléphonique et Télégraphique), an international body that sets standards for telecommunications. Virtually all 2400-bps modems have it.
- **V.32** The modulation scheme for 9600-bps modems set by the CCITT. Beware of 9600-bps modems that don't have V.32; without, it they won't be able to talk to the majority of 9600-bps modems.
- **V.32bis** The modulation scheme (also set by CCITT) for 14,400-bps modems. Any 14,400-bps modem you buy should have it.
- **V.42** An error-checking protocol established by the CCITT for high-speed modems. It caught on a few years back and usurped MNP as the prevalent standard.
- **V.42bis** A data compression standard set by the CCITT for use with V.42 error control. It can boost online throughput by 40 percent more than MNP 5 can. Note that some V.42bis modems are incompatible with one another, so shop carefully.

If you're buying a modem that runs at 9600 bps or faster, the bare necessities are V.42, V.42bis, V.32, and MNP 5. If the modem runs at 14,400 bps, you'll also want V.32bis. If you're buying a 2400-bps modem, MNP 5 is essential, and V.42 and V.42bis—while not necessary—are highly desirable.

Other acronyms you may spot include V.fast, a modulation scheme for 28,800-bps modems that the CCITT will unveil this year, and V.32terbo, an interim modulation scheme for 19,200-bps modems promoted by some vendors. V.32terbo will fade away with the coming of V.fast, which is supposed to be the final modulation standard. The world's phone networks will one day go digital. When that happens, we won't need modems, and as a result, we won't need modulation standards.

If you spot a V that's not listed here on a modem box, it may be one of several proprietary V's in circulation. Proprietary V's will probably be short-lived and shouldn't be considered an asset.

More Tips for Safe Sailing Under Windows

Reader Mike Fink of Fort Lauderdale, Florida, has written with additional solutions to recent questions about communicating under Windows. His first suggestion addresses the question of assigning communications ports under Windows (see "Zen and the Art of COM Ports," July 1993). DOS communications programs running under Windows often disagree with Windows about which IRQs and base addresses COM3 or COM4 is using. If you're running Windows in 386 Enhanced mode and want to assign an internal modem to COM4, Fink suggests using a text editor or SYSEDIT.EXE to add the following lines to the [386 Enh] section of SYSTEM.INI:

```
Com3Irq=-1
Com3base=-1
Com4base=02E8
Com4Irq=3
Com3AutoAssign=-1
```

Fink also has a suggestion relating to high-speed communications under Windows ("DOS Communications Under Windows," August 1993). We recommended that if you're getting low data rates or lots of errors while running DOS communications programs at high speed under Windows, you use a driver called TurboCom as an alternative to Windows' COMM.DRV. Fink says a shareware program called CHCOMB.EXE also merits consideration. Like TurboCom, CHCOMB.EXE lets DOS communications programs running under Windows use a 16550A UART chip, which is critical for high-speed, data-compressed communications. CHCOMB.EXE is available on PC World Online or from Cherry Hill Software for $10 (609/983-1414, 609/983-4188 fax).

By Judy Heim

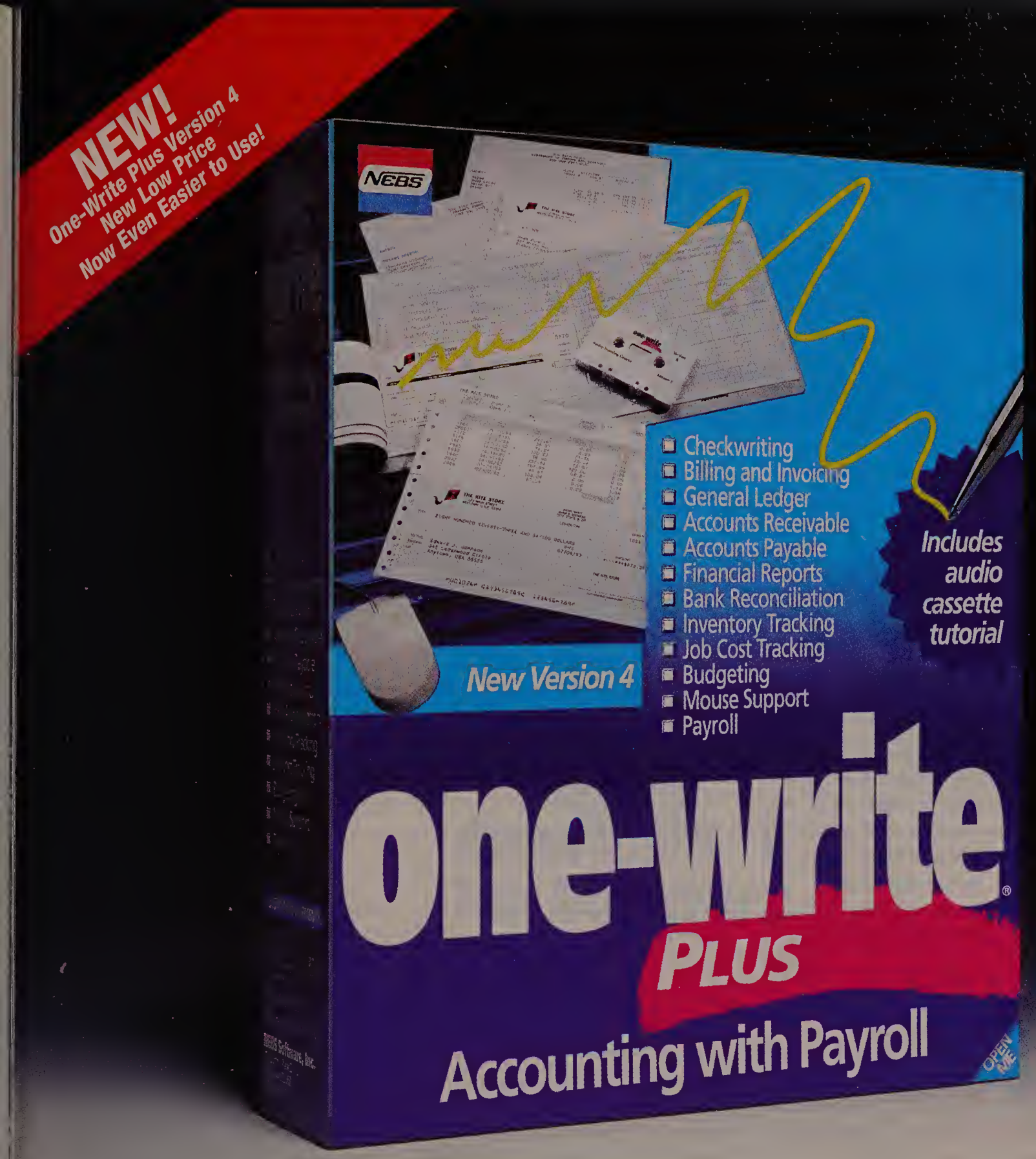
Judy Heim is a contributing editor for PC World *and the editor of* Online Investor, *a newsletter about using online services to manage investments.* Communications *welcomes your questions (see page 12 for contact information).*

USER GROUP TIP

Quiet Modems With Procomm's Quick Macros

I like to silence my modem at night, and while I can do so with an AT command in the terminal window, Procomm's meta keys let me automate the process. In Procomm's main screen, press <Alt>-M to get to the meta keys window. Cursor to the <Alt> key combination you want to assign to the command, press R<Tab>, and, to set the speaker volume to low, for example, type AT L0^M. Press <Enter> and S to save the assignment. To turn the speaker off completely and then back on, you can assign AT M0^M and AT M2^M to other meta keys.

Tim Greer
Phoenix PC Users Group



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HARDWARE Q & A

Leave It On or Turn It Off?

Q I've heard that turning a computer on and off wears out components and that you should leave your PC on all the time. But I've also heard that continual spinning wears out the hard drive sooner and you should turn off your PC if you're not going to use it for several hours. Whom should I listen to?
Gerald B. Lord, Salt Lake City

A The more times you turn a system on, the quicker you'll "wear it out," though not quite for the reason you give. When you turn a system off, it eventually reaches room temperature. Turn it on, and it heats up—a physical change that puts a strain on connections and components. Over time, the expansion and contraction can cause broken solder joints and even short circuits. The power supply, which heats up fastest, gets the worst of it.

As for the hard disk, while you may wear out the bearings a little sooner by leaving it spinning, warming up the drive when you turn on the system probably does more damage.

All this would seem to argue that you should never turn off your system. Not! Although turning your system off and on will wear it out sooner by some indeterminate amount, chances are you'll upgrade to another system well before your current one dies. Meanwhile, save on your electric bill. A recent Southern California Edison study indicates that turning a system off at the end of the workday reduces its energy consumption by 64 percent—about $100 in savings per year.

So here's my advice. If you're going to be away from your desk for more than a couple of hours, turn your PC off. Otherwise, turn it on in the morning and turn it off at the end of your workday.

Serial Ports: When Four Equals Two

Q My PC has two built-in serial ports. I needed to hook up a mouse, a modem, and a serial printer, so I bought an expansion card that added a third serial port. I put the modem on COM 1, the printer on COM 2, and the mouse on COM 3. Now when I use the modem, my mouse won't work. What's wrong?
Colleen Mulvaney, Hartford, Pennsylvania

A So you thought that just because DOS 3.3 and later versions support COM 1, 2, 3, and 4, you had four serial ports to play with? Ha! Make that more like two and a half.

Assuming you've configured the serial port on the expansion card as COM 3, you've run across a real gotcha—an interrupt request (IRQ) conflict inherent in the architecture of all AT-compatible machines, which includes virtually all 286, 386, and 486 systems, except Micro Channel models. Every port (and nearly every expansion card) needs its own IRQ line, which issues a special instruction to the CPU that says, in effect, "Hold everything; I need service now!" But in AT-compatible systems, COM 1 shares IRQ 4 with COM 3, while COM 2 shares IRQ 3 with COM 4. Why? Presumably because there are not many IRQ lines to go around—16 in all, with 6 to 8 of them already spoken for in most standard system configurations. (Micro Channel machines offer an advantage here because, theoretically, you can use up to eight serial ports without any conflict.)

With the shared-IRQ scheme, you can still hook four devices to four serial ports—as long as you don't use COM 1 and COM 3 or COM 2 and COM 4 at the same time. (And as long as they're not expansion cards—you can't put two serial port cards on, say, COM 1 and COM 3, since cards use their IRQ lines any time they want to.) The quick fix for your problem, then, is to configure the mouse for COM 2 and the printer for COM 3. You won't be able to print while you're online, but at least the mouse will work.

Alternatively, some serial port cards and even some PCs let you reassign COM port IRQ lines. If your card or PC lets you do this, make sure you switch COM 3 to an IRQ not used by the system or another card. If you have either Windows 3.1 or DOS 6.0, there's an easy way to scope out your PC's IRQ status. At the DOS prompt, change to your Windows or DOS directory, and type **MSD** to load the Microsoft Diagnostics. Type **Q** at the opening menu, and you'll see a list describing the most common use for each IRQ, along with the actual status of all 16 IRQ lines. Any line with a 'No' or a blank in the 'Status Detected' column is free for the asking.

Hurry Up, Please!

Q I have a 33-MHz 386 with a 64K memory cache, 4MB of RAM, and a Windows accelerator card. I'm trying to squeeze as much performance as I can out of this PC. Aside from adding memory (I plan on adding 4MB more), what's the best plan of action?
Daniel Younghusband, Grinnell, Iowa

A First, put a ceiling on what you'll spend. These days you can buy a 33-MHz 486DX with 4MB of RAM and a 170MB hard disk for $1500, so I'd think twice before spending more than $600 or $700 enhancing an old system. That 486-33 won't just give you twice the processing performance. You'll also get a big, fast hard disk and at least a year's free service and support on new components—and an old computer to sell for a few hundred bucks, if you wish.

With these cost constraints in mind, you can begin mapping your upgrade path by *subsystem*—processor, memory, video, and disk. Each subsystem has its own unique set of upgrade possibilities:

Processor. Here's where you can really spend the big bucks. For a little board with a 486-33 on it that plugs right into the 386 socket, expect to pay $500 to $700. Unless you have an IBM or a Compaq system, however, don't get your hopes up—most upgrade boards are compatible only with the most popular systems. Moreover, *PC World* tests show that you may get much less than

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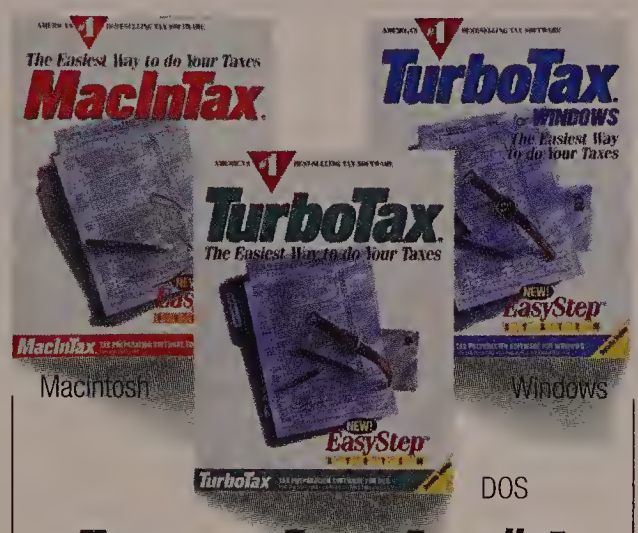

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twice the processing performance of a 386-33. If you have some time and you're the fearless type, a better solution might be to replace the entire motherboard. The cost should be in the same range, and you'll get more performance improvement, but finding a board that fits in your system—not to mention messing with all the connections and getting your old peripherals to work with the new system BIOS—can be challenging. Finally, if you run lots of statistical and financial calculations with a spreadsheet, you might want to consider a math coprocessor. Intel's 33-MHz 387 costs $119 for the SX version and $99 for the DX, while Cyrix's FastMath costs $79 for the SX and $99 for the DX. If you're a CAD user, a math coprocessor is a necessity.

Memory. Once you add the additional 4MB to your system, you'll have main memory covered—8MB of RAM is plenty for most Windows users. This upgrade may be the most cost-effective one you can perform, since Windows will now spend much less time swapping to disk. Likewise, the 64K memory cache is probably good enough. Unless the system is a server, or you're doing some very heavy-duty multitasking on your desktop, bumping the memory cache up to 128K or 256K will give you only a couple more percentage points of performance, and cache RAM is expensive.

Video. You did it, pal—you bought the Windows accelerator. Depending on the card, you may get several times the previous performance in many video operations. The only advice I can give is to make sure you have the latest Windows driver from the vendor, since the most recent revision is almost always faster than the previous one. Most card vendors maintain BBS's from which you can download new drivers and obtain tech support.

Disk. I have two words for you: disk cache. If you have Windows, you already own SmartDrive, one of the best disk caches you can buy. Presumably you're using it. This "upgrade" costs nothing and offers a huge performance advantage over no disk cache at all. Moreover, *PC World* tests determined that SmartDrive works just as well as hardware cache controllers that cost $200 or more. Another way to improve disk performance—especially if you've never done this chore before—is to defragment your hard disk using DOS 6.0's Defragmenter or similar utilities included with The Norton Utilities or Central Point's PC Tools. Defragging takes files whose parts have been scattered over the disk in the normal course of your writing them and makes each file's parts contiguous, reducing unnecessary head movement and speeding disk access.

For those who have old hard disks, one final suggestion: Try running The Norton Utilities' Calibrate or Gibson Research's SpinRite to optimize drive configuration. Better yet, if you have an old drive, you're probably running out of room and could use a newer, bigger one anyway—which I guarantee will be considerably faster than the old one. Or would you like to save that money for a new system?

By Eric Knorr

Eric Knorr is a contributing editor for PC World. Hardware *welcomes your questions* *(see page 12 for contact information).* ■

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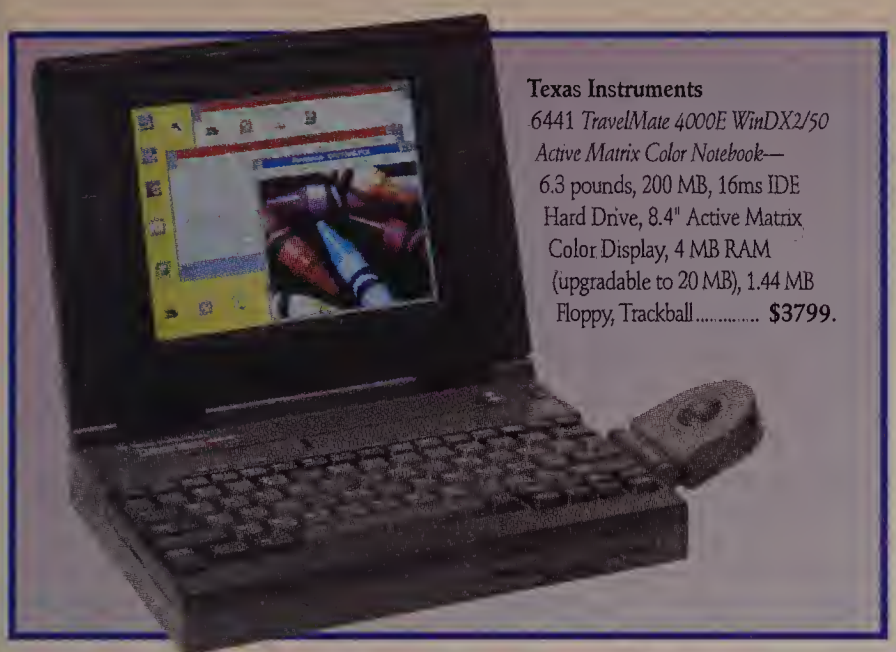

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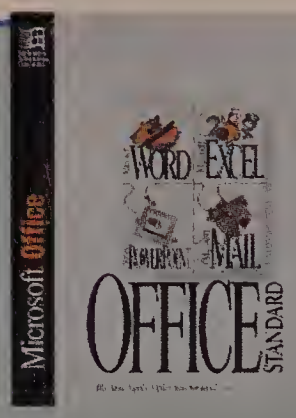

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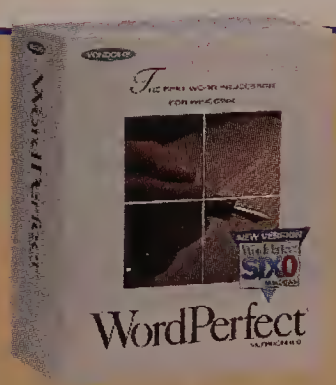

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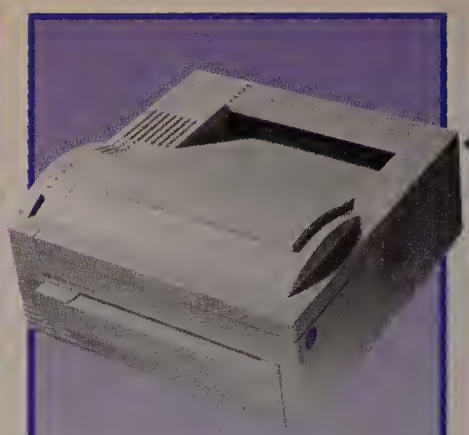

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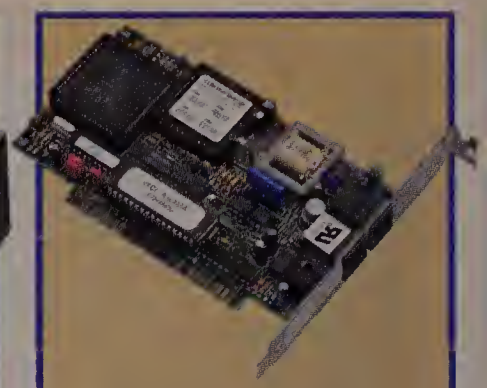

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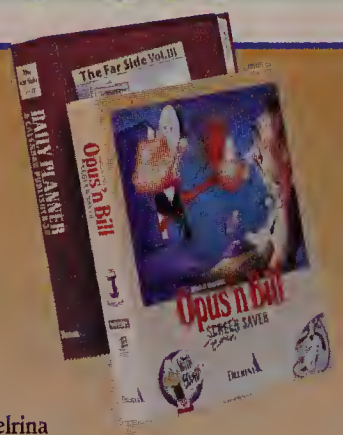

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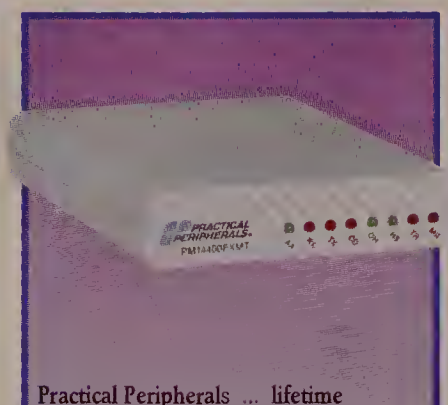

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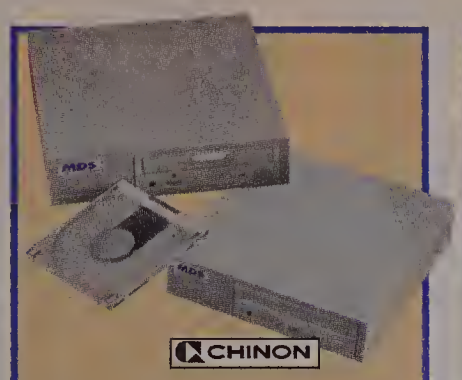

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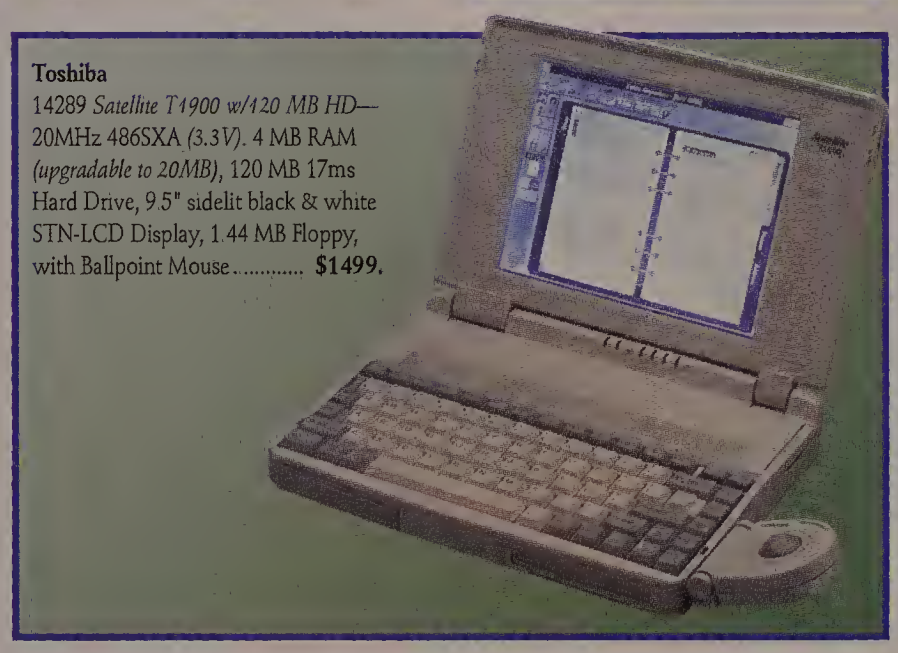

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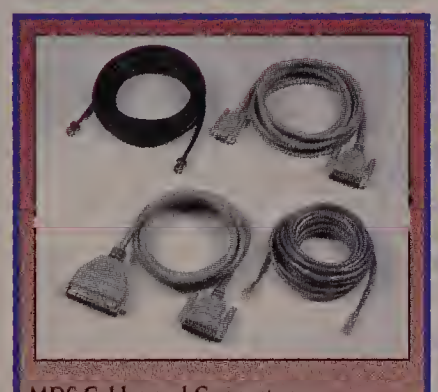

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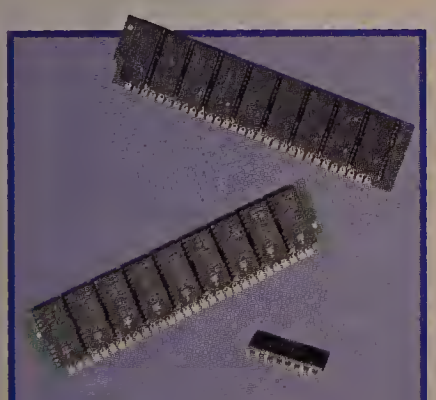

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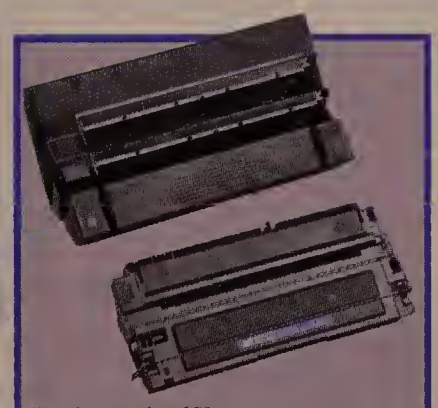

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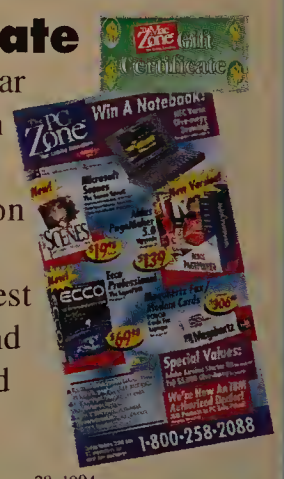

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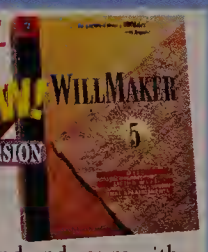

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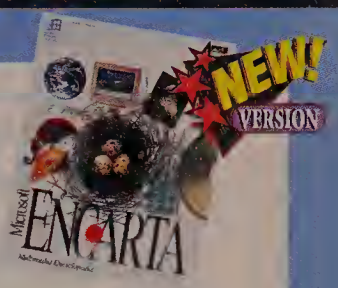

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STAR-DOT-STAR TIPS

Once a Day, Week, Year

I've seen several once-a-day and once-a-week batch file programs in your magazine; here's a solution that does both jobs. First, create the batch file CHECKDAT.BAT [**FIGURE 1**] and add the command **CALL CHECKDAT** to AUTOEXEC.BAT. Then create a file called ONCEDAY.BAT, which starts with the commands in **FIGURE 2** and ends with whatever other commands you wish to execute automatically once a day. Finally, create a batch file called ONCEWEEK.BAT containing the commands you want to execute once a week. Note that you can modify the FIND command in ONCEDAY.BAT so that your once-a-week commands run on any day.
Lee Kasner, Palm Harbor, Florida

Editor's note: Because I've covered this topic regularly, I print new "once-a-day" tips only once a year. This year's tip highlights several useful batch file techniques. These include the use of the ECHO and DATE commands together to capture the current date to a file, testing ERRORLEVEL after a FIND to determine if a string appears in a file, and using FIND on the output of the FC command. I modified this batch file to handle situations in which CHECKDAT.BAT has never been run (or in which LASTDAT.TXT, the file containing the last startup date, has been deleted). You can download CHECKDAT.BAT and ONCEDAY.BAT from PC World Online (see page 12 for more information).

```
@echo off
echo.|date>currdat.txt
if not exist lastdat.txt goto newday
fc currdat.txt lastdat.txt|find /i "no">nul
if errorlevel 1 goto newday
if errorlevel 0 goto sameday
:newday
copy currdat.txt lastdat.txt>nul
call onceday.bat
:sameday
del currdat.txt
```

FIGURE 1: HANDLE BOTH DAILY AND WEEKLY CHORES with this batch file, which you call from AUTOEXEC.BAT.

```
@echo off
find /i "Mon"<currdat.txt>nul
if errorlevel 1 goto nottoday
call onceweek.bat
:nottoday
REM Put once-a-day commands here.
```

FIGURE 2: PLACE THESE COMMANDS at the top of your ONCEDAY.BAT file so your system can also handle once-a-week events.

Pick a PC, Any PC

Many programs—especially Windows programs—won't work properly if you move them to a new drive or subdirectory. In your August 1993 issue, a tip called "Shifting C:'s" suggested using environment variables containing disk drive letters to solve this problem. As the response to the tip noted, though, not all programs accept environment variables as disk drive letters. In fact, Windows and most of its applications, many DOS applications, and Intel's fax board software refuse to run from a drive letter other than the one where they were installed.

My company had to find a solution to this problem. Each PC in our office is equipped with one or two Bernoulli Box removable-media disk drives, and a few have hard disks. Each employee has a Bernoulli cartridge containing the software he or she uses, making it easier for part-time and contract employees to share computing resources. But when an employee arrives at a machine with a different configuration, the drive letter of the Bernoulli cartridge may change, depending on what other drives the machine has (it might have one or two Bernoulli drives, one hard drive or none, and/or a RAM disk).

The solution? We use DOS's SUBST command to accommodate the varying configurations. Before installing a drive-dependent program on a removable cartridge, we run SUBST to create a drive letter for the removable drive. For instance, SUBST Z: C:\ creates a virtual drive Z: as an alias for the physical drive C: (our removable cartridge). We then install the software on drive Z:. Subsequently, when users change machines, they can use the SUBST command to make the cartridge appear as drive Z:, no matter what it really is.
Rick Roberts, Arlington, Texas

Editor's note: This tip is especially helpful to Windows users, even if they don't have removable media. One of Microsoft Windows' most annoying traits is that it's extremely difficult to move from one drive letter to another—and many Windows apps are just as bad. Say you run out of room on drive C:, but D: is wide open. You could copy Windows or a Windows application to the new drive, but you'd spend hours changing every reference to drive C: in

USER GROUP TIP

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Because I log on to multiple online services each day (CompuServe, America Online, and a dozen BBS's), I download lots of files. Instead of having a separate DOWNLOAD directory for each service, I've created only one directory. That way it's easier for me to keep the new files organized for later viewing and testing.

Kim Kamando
Phoenix PC Users Group

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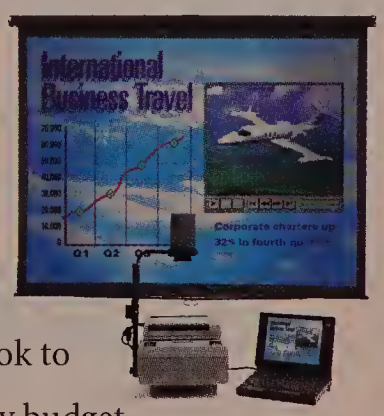

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WIN.INI and application INI files before things would run right. Reinstalling from the original disks would probably be faster. Shareware utilities can help with some of the process, but they're incomplete solutions and a pain to run in any case.

Instead, try creating a Windows-specific virtual drive—W:, for example—using the command **SUBST W: C:\WINDOWS**, then install Windows to W:\. You can also install major Windows applications to their own virtual drives. When the physical drive referred to by W: or an application's virtual drive fills up, move the appropriate files from C: to D:, and change the SUBST command in your AUTOEXEC.BAT file so that W: (or the appropriate virtual drive letter) refers to the application's new home directory.

If you use SUBST in this way, remember a few things. First, use LASTDRIVE to create drive letters for SUBST; I specify LASTDRIVE=Z in CONFIG.SYS if I plan to use SUBST. Second, you can't use SUBST on a network drive: You must use the network's drive-mapping software to ensure important directories on the network server map go to the same drive letter on every workstation. Make sure drive letters created with SUBST don't conflict with those set up by the network. Finally, Microsoft warns against using ASSIGN, BACKUP, CHKDSK, DISKCOMP, FORMAT, FDISK, JOIN, LABEL, RESTORE, or any disk maintenance utility on drive letters created by SUBST. Usually, the operation will fail, but poorly written third-party utilities can damage your data.

Spaced Out

Good typing habits can produce unexpected results when you use a word processor. Many typists thumb the <Space> bar twice after every period, even at the end of a paragraph. However, in WordPerfect for Windows, a space before a hard carriage return can cause awkward line wrapping, or even force text onto the next page. This can upset the line spacing on a page, and sometimes even adds extra blank pages in the middle of a document.

I wrote the WordPerfect for Windows macro SPACEOUT.WCM [**FIGURE 3**] to quickly strip out spaces preceding hard return codes (which appear as [HRt] in Reveal Codes mode). It contains two nested loops. The outer loop repeatedly search-

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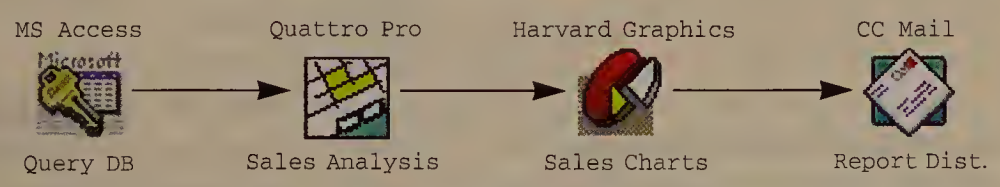

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```
// SPACEOUT.WCM
// Deletes spaces before hard returns

Application (WP;WPWP;Default;"WPWPUS.WCD")
OnNotFound(Quit@)
Display(State:On!)

Check := 1
PosPageTop()
While (Check = 1)
    SearchText
    (
      SearchString:" ";
      SearchDirection:Forward!;
      SearchScope:Extended!
    )
    PosCharPrevious()
    Found := 1
    While (Found = 1)
        GetWPData
        (
          MacroVariable: LastChar;
          SystemVariable: LeftChar!
        )
        If (LastChar =" ")
            DeleteCharPrevious()
        Else
            Found := 0
        EndIf
    EndWhile
EndWhile

Label (Quit@)
Quit
```

FIGURE 3: DON'T WANT SPACES BEFORE HARD CARRIAGE RETURNS? This WordPerfect for Windows macro eliminates them easily.

es for a space followed by a hard return. If it finds one, it places the cursor under the [HRt] code and enters the inner loop, which removes spaces to the left until a nonspace character is encountered.

The tricky part of creating this macro is there's no obvious way to get a space plus a hard return code into a search string within your macro. *[The search string within the SearchText() function's parameters appears to contain just a space, but it also contains a hard return. —Ed.]* The best way to enter a macro containing this sequence is to first create a keystroke macro that searches for a space followed by a hard return. You can then edit this simple macro to make the SPACEOUT macro.

To do this, start a keystroke macro by pressing **<Ctrl>-<F10>**. When the Record Macro dialog box appears, type in the macro name **SPACEOUT.WCM** and click on *Record*. Press **<F2>** to bring up the Search dialog box. Press **<Space>** once to add a space to the beginning of the search pattern, and click the *Codes* button. *[Make sure you have a document open that contains text, otherwise the Search command won't work. —Ed.]* When the Codes dialog box appears, scroll the Search Codes box downward and select *HRt*. Click the *Insert* button at the bottom of the Codes dialog box, and then the *Search* button in the Search dialog box. End the macro by pressing **<Shift>-<Ctrl>-<F10>**. Finally, open SPACEOUT.WCM (it should be in the WPWIN or the WPWIN\MACROS directory) as a WordPerfect document. Press **<Alt>-<F3>** and make sure the quoted string following the word 'SearchString' contains a space followed by the special code '[Embedded:HRt]'. Edit the macro by adding the remaining lines until it looks like Figure 3.

William J. Wolfe,
Champaign, Illinois

Editor's note: Mr. Wolfe's technique for getting special codes into a WordPerfect for Windows macro is useful for many applications—especially macros that remove, add, or manipulate hard carriage returns or tab characters. I modified the macro to move the cursor to the beginning of the document before searching, so it catches every offending space-return character pair. Whether you want to use SPACEOUT.WCM as is or as the starting point for your own macros, you can download it from PC World Online.

By Brett Glass

Brett Glass is a contributing editor for PC World. Star-Dot-Star *welcomes your tips, macros, batch files, and short programs. See page 12 for contact information.*

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Note: Keys to press are shown here in **boldface**. Keys to press simultaneously are joined by a hyphen. A bullet (•) links menu, option, button, check box, drop-down list box, and dialog box tab names in a series. This Instant Reference Card is the first of two on Excel 5.0; the second will detail Excel 5.0's advanced features.

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Show/hide TipWizard	or **View** • **T**oolbars • TipWizard • OK
Move tool bar to window's edge or to floating window	Point to empty area on tool bar and drag to new location

* Full screen and normal views are independently customizable.

Fold Here

ENTERING AND EDITING VALUES AND FORMULAS

An entry that Excel doesn't recognize as a number, date, time, or formula is formatted as text. Begin a formula with **=**. As you type an entry, it appears in both the active cell and the formula bar. To finish an entry, press **<Enter>**, click , or select another cell.

Enter number as text	Begin with ' or format cell as text before entering
Enter date value	Type date with hyphens or slashes (*mm/dd/yy*)
Enter current date	**<Ctrl>-<Semicolon>**
Enter time value	Type time with colons (*hh:mm*:ss)
Enter current time	**<Ctrl>-<Shift>-<Colon>**
Enter relative cell address	Type address or select cell to reference
Make cell address absolute	**<F4>** until variation reached
Insert SUM function(s) for selected column(s)/row(s) in bottom/right cell(s) or propose SUM if selection is one cell	or **<Alt>-=**
Insert function with parameter placeholders	(standard tool bar or formula bar) or **I**nsert • **F**unction, select function, **F**inish
Enter same data into all cells in range(s)	Select range(s), type data, **<Ctrl>-<Enter>**
Enter value as a fraction	**0<Space>**, type fraction with slash
Paste existing range name in formula	Name box's , select name; or **<F3>** or **I**nsert • **N**ame • **P**aste, select name, OK
Edit active cell	**<F2>** or double-click cell or click formula bar
Go to start/end of entry	**<Home>**/**<End>** in Edit mode
Abandon edit or entry	**<Esc>** or

WORKING WITH RANGES

Select range smaller than entire row or column	Select corner cell. Drag to opposite corner; or hold <Shift>, select opposite corner
Select entire row/column	Click row number/column letter

WORKING WITH RANGES (continued)

Select consecutive rows/columns	Select first row/column. Drag to last row/column; or hold **<Shift>**, select last row/column
Select 3-D range (same range in consecutive worksheets)	Select range in first/last worksheet, hold **<Shift>**, click tab of last/first worksheet
Select noncontiguous ranges	Select range, hold **<Ctrl>**, select next range(s)
Select all cells in worksheet	Click intersection of row and column headers or **<Ctrl>-<Shift>-<Space>**
Move active cell indicator within selected range	**<Enter>** or **<Shift>-<Enter>** or **<Tab>** or **<Shift>-<Tab>**
Cut selection to Clipboard	or **<Ctrl>-X** or **E**dit • **C**ut
Copy selection to Clipboard	or **<Ctrl>-C** or **E**dit • **C**opy
Paste from Clipboard	or **<Ctrl>-V** or **E**dit • **P**aste
Move selected range	Drag edge to new location; or cut and paste
Duplicate selected range	**<Ctrl>**-drag edge; or copy and paste
Copy single entry to range	Copy entry, select target range, paste entry
Fill adjacent range with series (Jan, Feb, and so on) based on (or with copies of) selected cells	Drag fill handle (selection's lower right corner) over target range; or right-drag fill handle over range, Copy Cells or Fill Series
Fill adjacent range with copies of selected cells or increment single selected numeric value	**<Ctrl>**-drag fill handle over range
Fill selected range with series based on range's first row/column	**E**dit • **F**ill • **S**eries • **R**ows/**C**olumns, select series type, enter step value and stop value if needed, OK
Erase contents of selected range(s)	**<Delete>** or **E**dit • **C**lear • **C**ontents or drag fill handle into range if single range
Erase contents, formats, and notes of selected range(s)	**E**dit • **C**lear • **A**ll or **<Ctrl>**-drag fill handle into range if single range
Insert row(s)/column(s) above/left of selected one(s)	**<Ctrl>-<Plus>**; or **I**nsert • **R**ows/**C**olumns; or right-click selection, Insert
Delete selected row(s)/column(s)	**<Ctrl>-<Minus>**; or **E**dit • **D**elete; or right-click selection, Delete
Insert range above/left of selected range	**<Ctrl>-<Plus>**; or **I**nsert • **C**ells; or right-click selection, Insert. Shift Cells **D**own/**R**ight • OK
Delete selected range, moving cells below/right of it up/left	**<Ctrl>-<Minus>** or **E**dit • **D**elete, shift Cells **U**p/**L**eft • OK
Name selected range	Click name box, type name, **<Enter>**
Delete range name	**I**nsert • **N**ame • **D**efine, select name, **D**elete • OK
Sort selected range by row in ascending/descending order of column that contains active cell	/hold **<Shift>**, ; or **D**ata • **S**ort • **A**scending/**D**escending • OK
Show only (filter) rows (in selected range) having cell in active cell's column matching active cell	; or extend range to header row, **D**ata • **F**ilter • Auto**F**ilter, of filter key's column, select key
Turn off active filter	**D**ata • **F**ilter • Auto**F**ilter
Set height/width of selected row(s)/column(s)	Drag border below/right of row number/column letter; or **F**ormat • **R**ow/**C**olumn • **H**eight/**W**idth, type height/width, OK
Fit row(s)/column(s) to tallest/widest entry	Double-click bottom/right edge of (selected) row/column header

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MICROSOFT EXCEL 5.0 BASICS

WORKING WITH RANGES (continued)

Hide selected row(s)/ column(s)	**<Ctrl>-9**/**<Ctrl>-0**; or **F**ormat/**R**ow/**C**olumn • **H**ide; or right-click selection, Hide
Unhide row(s)/column(s) spanned by selected ones	**<Ctrl>-<Shift>-<Open Parentheses>**/ **<Ctrl>-<Shift>-<Close Parentheses>** or **F**ormat • **R**ow/**C**olumn • **U**nhide

FORMATTING CELLS

You can use the Format Cells tab dialog box to change multiple number, alignment, font, border, pattern, and protection formats quickly. First, select the target range, then choose **F**ormat • **C**ells or press **<Ctrl>-1**, or right-click the selected range and choose Format Cells to open the dialog box. Press **<Ctrl>-<Tab>** or **<Ctrl>-<Shift>-<Tab>** or click a tab to select a new tab.

Set selection's font	**<Ctrl>-F** or click font box. Type font name, **<Enter>**; or type first few letters, **<Down>** or font box's , select font
Set selection's font size	Font size box's , select size
Set bold/italic/underline (toggle)	or **<Ctrl>-B**/ or **<Ctrl>-I**/ or **<Ctrl>-U**
Align left/center/right (toggle)	/ /
Wrap text	Open Format Cells tab dialog box, Alignment • **W**rap Text • OK
Center text across selected columns	
Set currency/comma/percent format as defined in Format • Style dialog box	or **<Ctrl>-<Shift>-$**/ / or **<Ctrl>-<Shift>-%**
Add/remove one decimal place in number format	/
Set cell borders/cell color/ font color	/ / for button's current option or its to choose new one
Copy selected range's format to target range or ranges	, select target range; or double-click , select target ranges,

WORKING WITH WORKSHEETS

Go to cell A1	**<Ctrl>-<Home>**
Go to intersection of last row and column that had entries	**<End>-<Home>**
Go to cell or named range	**<F5>** or **E**dit • **G**o To or click name box's , double-click or enter address or name
Go to first unempty cell before or after empty cell	**<Ctrl>-<Left>**/**<Ctrl>-<Right>**/ **<Ctrl>-<Up>**/ **<Ctrl>-<Down>**; or **<End>**, cursor key
Move right/left width of screen	**<Alt>-<Page Up>**/**<Alt>-<Page Down>**
Magnify/shrink view of active worksheet's cells	100% or **V**iew • **Z**oom, select or set percentage, **<Enter>**
Go to next/previous sheet	**<Ctrl>-<Page Down>**/**<Ctrl>-<Page Up>**
Go to any sheet	Use scroll buttons to left of sheet tabs, click tab
Select consecutive sheets	Select first sheet, hold **<Shift>**, select last one
Insert sheet(s) before selected sheet(s)	**<Shift>-<F11>** or **<Alt>-<Shift>-<F1>** or **I**nsert • **W**orksheet
Delete selected sheet(s)	**E**dit • **D**elete Sheet • OK
Rename worksheet	Double-click worksheet's tab or **F**ormat • **S**heet • **R**ename, type name, OK

WORKING WITH WORKSHEETS (continued)

Undo last action	or **<Ctrl>-Z** or **E**dit • **U**ndo
Repeat last action	or **<F4>** or **E**dit • **R**epeat
Get help on button, menu option, or other object	and click object
Protect sheet's/workbook's contents, objects, or scenarios that have protection format	**T**ools • **P**rotection • **P**rotect Sheet/Protect **W**orkbook, set options, type password, OK, retype password, OK
Split worksheet horizontally/ vertically	Drag / split box (black bar at top/ right of scroll bar arrow)
Split worksheet above and left of active cell	**W**indow • **S**plit
Unsplit worksheet	**W**indow • Remove **S**plit
Prevent/allow scrolling of top left pane of split worksheet	**W**indows • **F**reeze Panes/Unfreeze Panes
Check spelling of selection or active worksheet	or **<F7>** or **T**ools • **S**pelling

WORKING WITH WORKBOOK FILES

Open new workbook file	or **<Ctrl>-N** or **F**ile • **N**ew
Open existing workbook file	or **<Ctrl>-O** or **F**ile • **O**pen, select file
Open new view of active file	**W**indow • **N**ew Window
Go to next/former workbook file window	**<Ctrl>-<Tab>** or **<Ctrl>-<F6>**/**<Ctrl>-<Shift>-<Tab>** or **<Ctrl>-<Shift>-<F6>**
Go to specific file window	**W**indow • **1**/**2**/... or click window if visible
Tile/cascade file windows	**W**indow • **A**rrange • **T**iled/**C**ascade
Save relative positions of open workbook files	**F**ile • Save **W**orkspace
Open saved workspace	**F**ile • **O**pen • List Files of **T**ype • Workspaces (.xlw), select file, OK
Show/hide window's grid lines/ row and column headers/zero values/scroll bars/sheet tabs	**T**ools • **O**ptions • View • **G**ridlines/Row & Column **H**eaders/**Z**ero Values/Horizontal Scroll Bar/ **V**ertical Scroll Bar/Sheet **T**abs
Save active workbook file	or **<Ctrl>-S** or **F**ile • **S**ave
Save active workbook file to other name/directory/format	**F**ile • Save **A**s or **<F12>**
Close active workbook file	Double-click or **<Ctrl>-<F4>** or **F**ile • **C**lose
Print active file or range	or **<Ctrl>-P** or **F**ile • **P**rint
Fit print range to single page	**F**ile • Page Setup • Page • **F**it to • OK
Preview printout on screen	or **F**ile • Print Preview
Print worksheet sideways	**F**ile • Page Setup • Page • **L**andscape • OK
Protect file from unauthorized access/change	**F**ile • Save **A**s • **O**ptions, type Protection/ Write Reservation password, OK, retype password, OK
Set default number of sheets, directory, font, font size, and other options	**T**ools • **O**ptions • General, set defaults, OK
Set default decimal places	**T**ools • **O**ptions • Edit, set defaults, OK
Set default number, currency, date/time formats	**T**ools • **O**ptions • Module General, set defaults, OK

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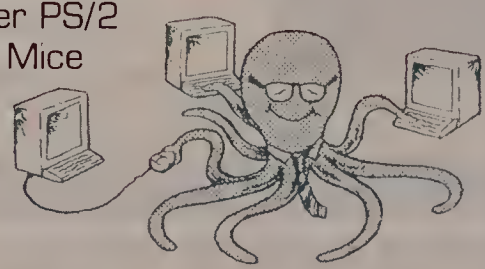

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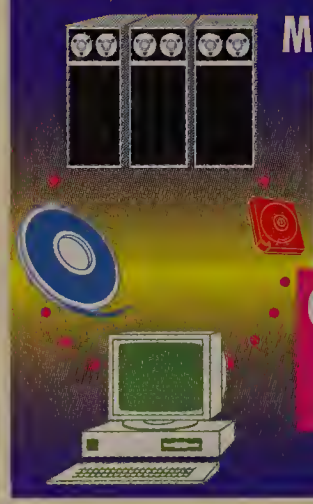

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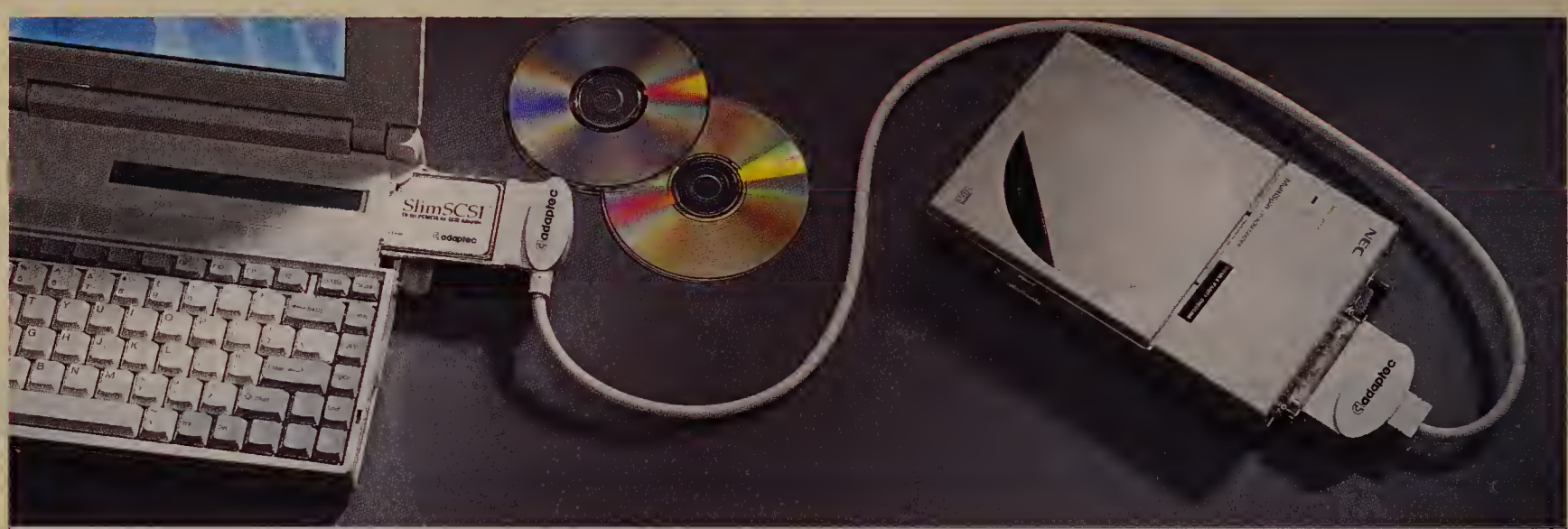

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PRINTER SHARING & MEMORY

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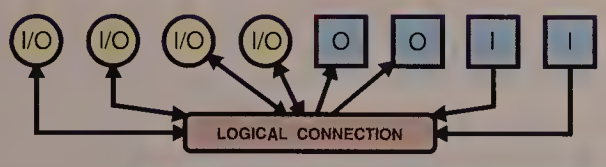

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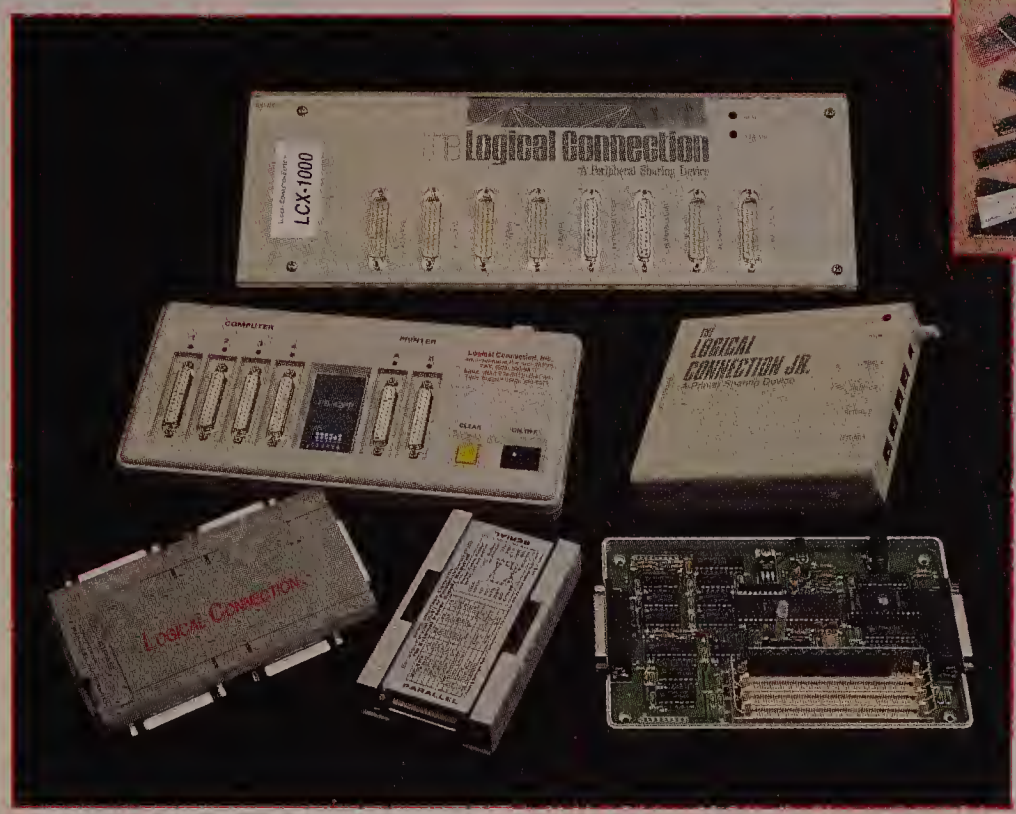

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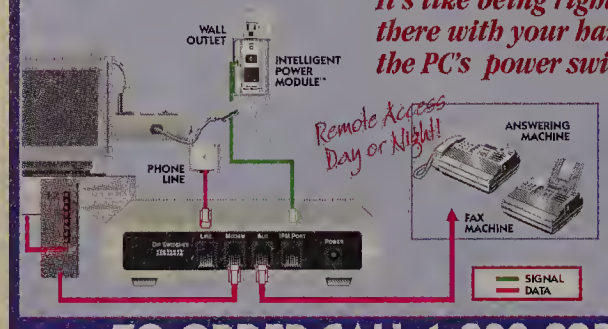

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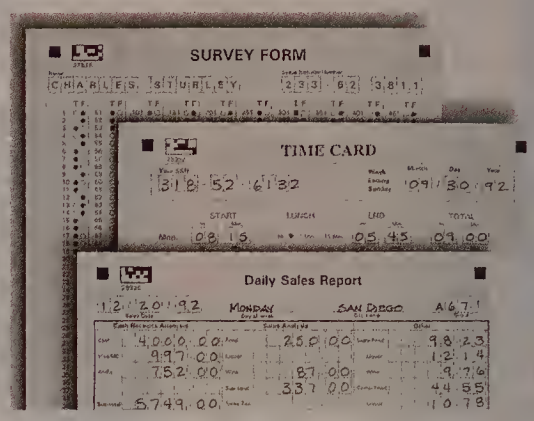

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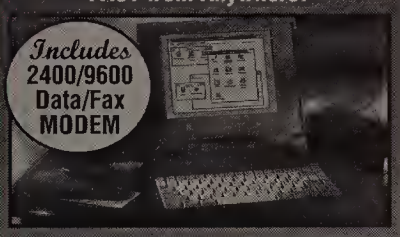

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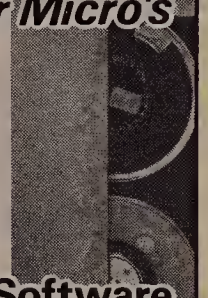

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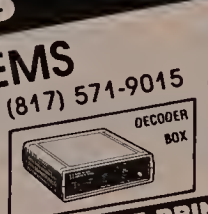

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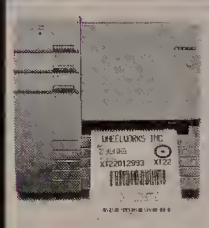

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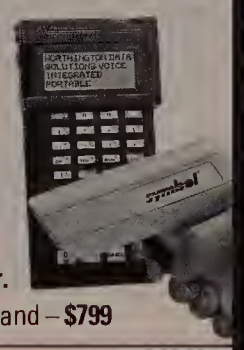

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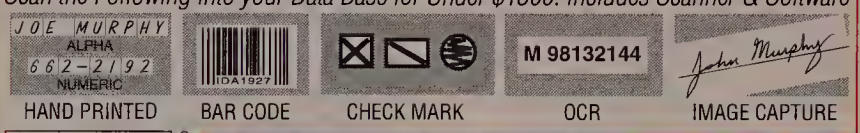

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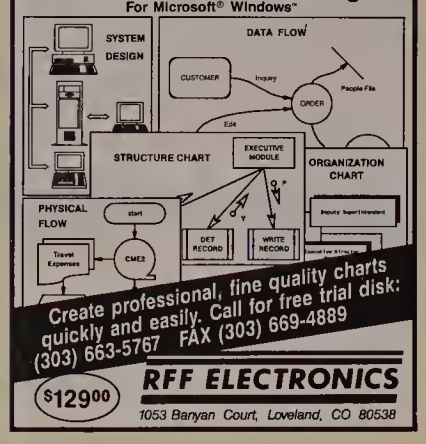

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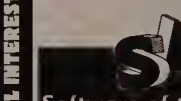

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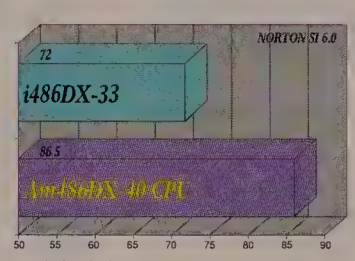

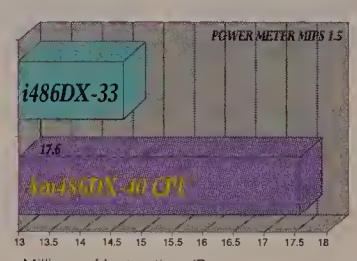

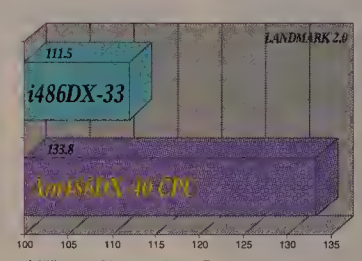

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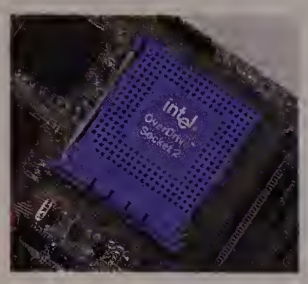

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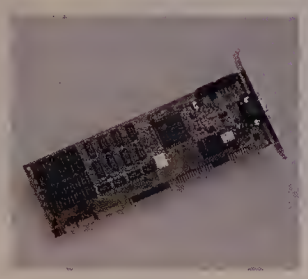

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	8Meg	500987-003	419.00
	16Meg	500987-004	619.00
	32Meg	500987-005	1399.00
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Premium 386/33TE, 486/25TE, 33TE			
Prem. Serv., Prem II 386SX/20, 25			
Prem. II 386/25, 386/33, 486/33, 486SX/20	8Meg	500780-001	398.00
Premium 386/33T, Prem. 386SX/16			
Prem. II 386SX/20, 25		500780-004	189.00
Premium 386/25, 33, 386/33T, 386SX/16,		500780-003	59.00
Prem. II 386SX20,25		500780-001	59.00
Premia	8Meg	501159-002	CALL
Premia	16Meg	501159-003	CALL
Premia	32Meg	501159-004	CALL
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Z386SX	2Meg	Z-605-1 modules	119.00

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30F5360 (2Meg)	30-286, 25-286, 50 MTHR 8D.	104.00
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6450379 (2Meg)	80-111, 311-121, 321, 081, 161	84.00
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6450604 (2Meg)	70-061, E61, 121,50Z, 55SX, 65SX, P-70, 55LS, 65LS, X-Station 120 & 130, 35SX, 35LS, 40SX	89.00
6450608 (2Meg)	70-A21, A-61, B-21, B-61, 35SX, 35LS, 40SX, Val Pt. 325T	90.00
78X8955 (128K)	25	35.00
34F2933 (4Meg)	35SX, 40SX, 55SX, 65SX, 55LS, 65LS	185.00
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1057035 (512K)	P/S1-286	49.00
92F9935 (2Meg)	P/S1 & P/S1/386SX-2121	99.00
92F9694 (4Meg)	P/S1 & P/S1/386SX, Model-2121	189.00
6450902 (2Meg)	56, 57, 57SX,90, 95, P-75, 57SLC Value Point 77 486DX2, 486SX, SVR 85	95.00
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DeskPro 386/25, 386/20	1Meg Module	113131-001	79.00
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DeskPro 386S-16MHz	1Meg Exp Bd	113633-001	149.00
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	4Meg Module	112534-001	229.00
DeskPro 386/20E	1Meg Exp Bd	113644-001	149.00
DeskPro 386/25E	4Meg Exp Bd	113645-001	329.00
	1Meg Module	113131-001	79.00
	4Meg Module	113132-001	229.00
DeskPro 286N, 386N, 386SX/20, 386/25M, 486/33M, 486S/25M, 486S/16M	1Meg Module	118688-001	59.00
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Port. 486C	8Meg Module	128877-001	399.00
M Series Exp Bd	0-64Meg	129160-001	279.00
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Prosignia PC Server, 486/33, 486 DSX/66	8Meg	141685-001	429.00
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LTE LITE/20, 25, 25C	8Meg Module	129769-003	399.00
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LTE LITE 4/25C, 4/23E, 433C	4Meg Module	142337-002	219.00
LTE LITE 4/25C, 4/23E, 433C	8Meg Module	142337-003	429.00
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	8Meg	139499-001	369.00
Contura 4/25, 4/25C, 4/25CX	4Meg	146520-001	189.00
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T2000SX/T1000LE	4Meg	PC-PA8314U	219.00
T2000SX/T1000LE	8Meg	PC14-PA8315U	419.00
T2000SXE/2200SX/T1800, 1850, C	2Meg	PC-PA2000U	94.00
T2000SXE/2200SX/T1800, 1850, C	4Meg	PC-PA2001U	219.00
T2000SXE/2200SX/T1800, 1850, C	8Meg	PC-PA2002U	419.00
T4400SX, SXC T6400	4Meg	PC-PA2004U	219.00
T4400SX, SXC T6400	8Meg	PC-PA2005U	419.00
T4400SX, SXC T6400	16Meg	PC-PA2010U	713.00
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T4500, T4500C, T4600, T1900, T1900C (3.3 v)	8Meg	PC-PA2013U	479.00
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T3100SX	2Meg	PC15-PA8308U	109.00
T3100SX	4Meg	PC15-PA8310U	209.00
T3200	3Meg	PC6-PA7137U	185.00
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T3200SX	4Meg	PC12-PA8909	209.00
T3200SXC	2Meg	PC19-PA8318U	119.00
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AST Power Exec 3/25C, 425EL	4Meg		199.00
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TI Travelmate 3000	2Meg	2566996-1	84.00
TI 4000	4Meg, 16Meg		199.00, 1549.00
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Packard Bell P8 9500	–	–	–	124	–	–	209	–	–	–	–
Panasonic 4420/4450I	–	–	–	129	–	–	209	–	–	–	–
Panasonic 4410/4430	–	–	–	126	–	–	195	–	–	–	–
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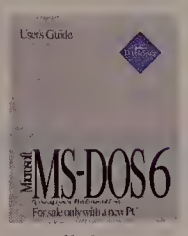

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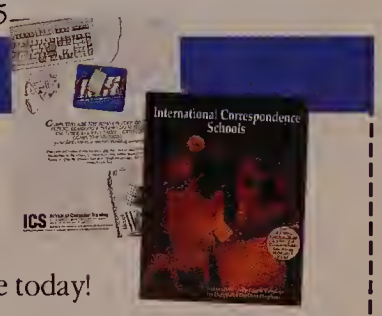

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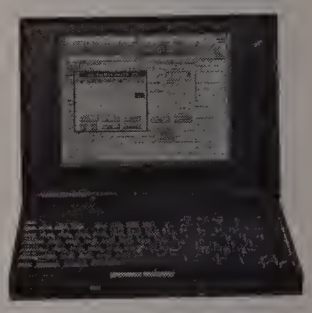

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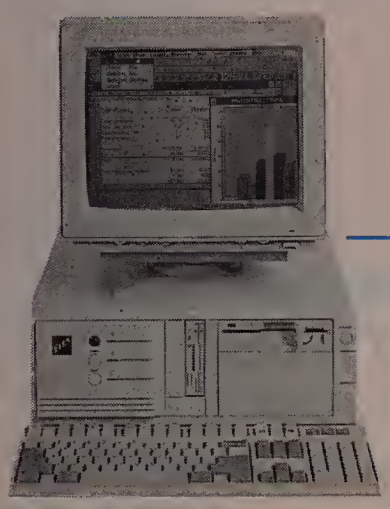

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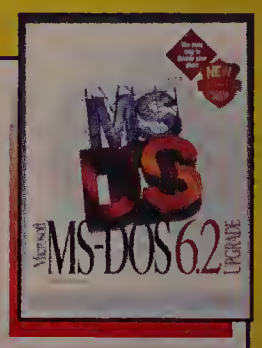

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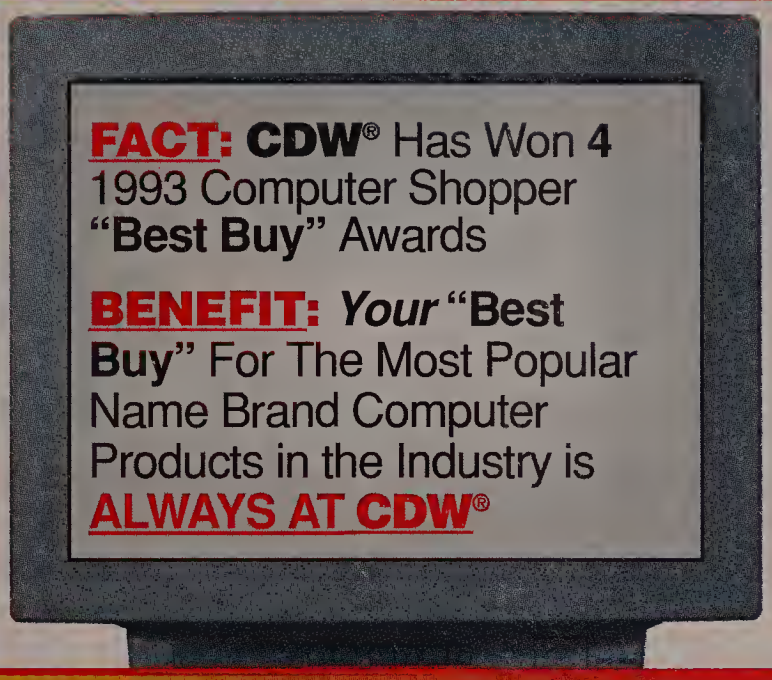

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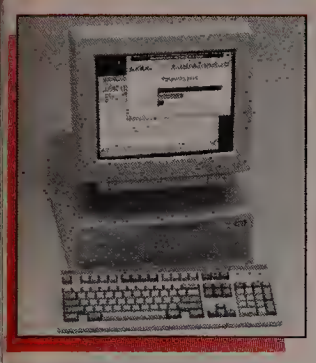

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SUN

SPARCSTATION ELC
4MB MOD X104D
16MB MOD X116D
SPARCSTATION IPC
4MB KIT X104Y
16MB KIT X116Y
SPARCSTATION IPX
4MB MOD X104U
16MB MOD X116U
SPARCSTATION 2
16MB KIT X116W
SPARCSTATION 330
8MB KIT X108E
32MB KIT X134A
SPARC 1, 3/60, 60, 4/40, 60, 65
4MB KIT X104C,G,H,Y
SPARC SLC (4/20)
4MB MOD X105Z
4/110
16MB KIT X116D
SPARC IL 4/40, 60, 65, 70 330, 370, 380
16MB KIT X116H,Y,WD
4/330, 4/370, 4/390
8MB KIT X108E
32MB KIT N/A
SPARC1S
16MB MOD X116F
64MB KIT X164F
SPARCSERVER 630MP, 670MP, 690
64MB XIT X168A

MAGNAVOX

NOTEBOOK METALIS 286, 386SX
4MB MOD
NOTEBOOK METALIS 386SX1S & 386SX20
2MB MOD N/A
4MB MOD N/A
HS500, 300, 386SX, 286
2MB KIT
4MB KIT
HS, PN, SGX 1286, 286, HS, PN, SGX 1486, SGP160 PN64CD, 386SX-16, HS, PN3X20, HS40CD 386-20SX, HS3300, 386-33 HS486, 486SX
1MB SIMM
4MB SIMM

DELL COMPUTER CORPORATION

320N, 212N, 320NPLUS
1MB MOD 3133203
2MB MOD 3103204
NL20, NL25
2MB MOD 3103213
325P, 325D, 333D, 333P, 320SX, 433P, 486D, 486P
1MB MOD 3102505
4MB MOD 3102507
486D, 486P
16MB MOD 3102625
420, 425, 433, 466
450DE, 450DE, 450TE
2MB KIT 3102466
4MB KIT 3102467
8MB KIT 3102468
TE & SE ONLY
16MB KIT 3102469
32MB KIT 3102530
NOTEBOOK 325NC, 325N
2MB
433E & 425E
2MB KIT 3102389
4MB KIT 3102390
8MB KIT N/A
316SX
2MB KIT 3102349
325N, NC NOTEBOOK
2MB MOD 3103210
PERFORMANCE 1,L,M, SERIES
4MB 3103325
16MB 3103327
PERFORMANCE ME SERIES
4MB 3103334
8MB 3103335
16MB 3103336
32MB 3103337

SILICON GRAPHICS

4D/100 & /120, 4D SERIES 200, 300, 400
8MB KIT H4C08X
32MB KIT H4D32X
4D/20 PERSONAL IRIS, 4D25, 4D40, 4D50, 4D70, 4D80
4D35, CS/12, TGO/HO 12 & 16
4MB KIT H4C05E
4D/20 & 25
16MB KIT HU1C16B
IRIS CRIMSON
16MB KIT H4C16X
64MB KITR N/A
4D/RX, INDIGO RPC, PERSONAL IRIS & IRIS INDIGO
8MB KIT HUC08C
32MB KIT HUC32H

Panasonic

CF-420
2MB MOD N/A
6MB MOD N/A
CF-170, CF-270, CF-370
1MB MOD CFBA165
4MB KIT N/A
KX-P4410, KX-P4425, SX-P4430
1-4MB E-C KXP443
2-4MB E-C KXP441
3-4MB E-C N/A
4MB E-C N/A
KX-P4450
1MB E-C KXP44D
KX-P4450i
1-4MB E-C KXP443
2-4 MB E-C KXP441
3-4MB E-C N/A
4MB E-C N/A
KX-P4455
2MB E-C KXP455/2

QMS

QMS-PS 410
1-4MB E-C N/A
2-4MB E-C N/A
4MB E-C N/A
QMS 815, 815MR, 815
1-6MB E-C N/A
2-6MB E-C N/A
4-6MB E-C N/A
8MB E-C N/A

SHARP

PC 6220
1MB MOD C6621B
JX9500PS LASER
1MB E-C JX95MJ
JX9500C, 9500H, 9700
1MB C-C N/A
1 5MB C-C N/A
2 5MB C-C N/A
4MB C-C N/A

OKIDATA

OL 400
1MB E-C 70014701
2MB E-C N/A
OL 600, 820
1MB E-C 70015201
2MB E-C N/A
3MB E-C N/A
4MB E-C N/A
OL 830, 840
2MB E-C 70016501

IBM

N51SX & N51SLC
2MB MOD D7G1879
4MB MOD D7G1890
8MB MOD D7G1881
L40SX, N33SX LAPTOP
2MB MOD 79F0999
4MB MOD 79F1000
8MB MOD 79F1001
P75 & P70
2MB MOD 6450902
4MB MOD 6450128
PS/1 286
512K MOD 1057035
2MB MD 92F9935
PS/1 386SX
512K MOD 1057035
2MB MOD 92F9935
4MB MOD 92F9694
PS/2 25
128K KIT 78X8955
PS/2 25 & 30 286
512K KIT 30F5348
2MB KIT 30F5360
0-16MB E-C N/A
PS/2 35SX, 35LS, 40SX
1MB MOD 6450633
2MB MOD 6450604
4MB MOD 8779977
8MB MOD 6450129
PS/2 55SX & 55LS
1MB MOD 6450633
2MB MOD 6450604
4MB MOD 8779977
0-16MB E-C
PS/2 57SX, N57SLC, 56SX, 56SLC, 70 & 77
2MB MOD 6450902
4MB MOD 6450128
8MB MOD 6450130
PS/2 70-001, 70-121, 121, 001, E61
1MB MOD 6450633
2MB MOD 6450604
0-32MB E-C
PS/2 70-A21, -A18, -A21, -A61, 001, A21
2MB MOD 6450608
0-32MB E-C
PS/2 -A18, A21, A31
4MB MOD 6451060
0-32MB E-C
MODEL 80CD & 95X
INSTALL IN PAIRS
2MB MOD 6450902
4MB MOD 6450128
8MB MOD 6450130
16 BIT EXPANSION CARD FOR MODELS 50, 60, 55SX, 65SX, 55LS MAXIMUM TWO CARDS PER MACHINE
0-16MB E-C
1MB MOD 6450633
2MB MOD 6450604
4MB MOD 8779977
8MB MOD 6450129
32 BIT EXPANSION CARD FOR MODELS 70 & 80 MAXIMUM TWO CARDS PER MACHINE
0-32MB E-C
1MB MOD 6450633
2MB MOD 6450604
4MB MOD 8779977
6MB MOD 6450129
40Y9 & 40Y9E
3.5MB E-C 1038675
4029
4MB MOD 118335
THINKPAD 300
2MB CRD33G9288
6MB CRD33G2989
THINK-AD 700T
6MB BZD6451167
THINKPAD 700 & 700C
2MB MOD07419
4MB MOD07G420
8MB MOD07G421
N45SL
2MB MOD92F8804
CL57SX LAPTOP
2MB CRD07G1419
4MB CRD07G1420
8MB CRD07G1421
PS/1 CONSULTANT 2133, 611, 615, G14, ESSENTIAL W11, W13, W14, VALUEPOINT 325T & EXPERT 611, 613, 614
1MB MOD6450633
2MB MOD6450608
4MB MOD6450128
8MB MOD6450130
VALUEPOINT 425SX,25, DX/33 & DX2/66 INSTALL IN FOURS
1MB MOD96F9250
4MB MOD96F9291
PRO 386SX N21-23
2MB MOD6450902
4MB MOD6450128
8MB MOD6450130
PS/2 80-041
1MB MOD6450375
PS/2 80-001, 111, 121, 161, 311 & 321
2MB MOD6450379
MODEL 95-50 DMF, DMT ECC MODULES
4MB MOD6451158
8MB MOD6451158
XSTATION 120 & 130
1MB VRAM4201
1MB MOD6450603
2MB MOD6450604
4MB MOD34F2933
RS/6000 POWERSTATION POWERSERVER 220
4MB MOD6450128
8MB MOD6450130
RISC SYSTEM 6000
NO BOARD INCLUDED
16MB KIT 4010
32MB KIT 4033
64MB KIT 4036
PS NOTE
4MB N/A
8MB N/A

COMPAQ

LTE 5000 PROCESSOR
512K MOD 117077001
LTE 286
1MB KIT 117081001
2MB KIT 117001002
4MB KIT 117001003
LTE 386S/20
4MB C-C 121125002
LTE LITE 20, 25
2MB C-C 129769001
4MB C-C 129769002
8MB C-C 129769003
16MB C-C N/A
SLT/286
1MB MOD 110235001
4MB MOD 110237001
SLT 386S/20
4MB MOD 118305001
PORTABLE III
2MB KIT 107332001
INTERFACE 107808001
EXP BOARD 107811001
PORTABLE 386
1MB KIT 107651001
INTERFACE 107707001
4MB E-C 107653001
4MB ADM 107654001
PORTABLE 486C
2MB MOD 118689001
4MB MOD 118690001
8MB MOD 128877001
DESKPRO 286
2MB KIT N/A
0-16MB E-C N/A
DESKPRO 286E
2MB KIT N/A
0-16MB E-C N/A
DESKPRO 386-16
1MB KIT 108071001
1MB E-C 108069001
2MB E-C 108069-71-001
4MB E-C 108070001
8MB E-C 108070-72-001
DESKPRO 386S
1MB E-C 113633001
4MB E-C 113634001
1MB MOD 113646001
4MB MOD 112534001
DESKPRO 386/20E, /25E
1MB E-C 113644001
4MB E-C 113645001
1MB MOD 113131001
4MB MOD 113132001
DESKPRO 386/33
2MB MOD 113144001
DESKPRO 386/33L, 486/33L
2MB MOD 115144001
8MB MOD 116561001
32MB MOD 116566001
6 SOCK-EC 116569001
DESKPRO 486/25, /50L
2MB MOD 115144001
8MB MOD 116561001
32MB MOD 116568001
DESKPRO 386/25N, 486/25N, 486/33N, 486/33N1/16M, /25M
1MB MOD 116688001
2MB MOD 116689001
4MB MOD 116690001
8MB MOD 128677001
8 SOCK-EC 129160001
DESKPRO 286N, 386N, 386S/20N
1MB MOD 116688001
2MB MOD 116689001
4MB MOD 116690001
8MB MOD 128677001
8 SOCK-EC 129160001
PROLINEA 4/25, 3/25CS
2MB KIT 141738-001
8MB KIT 141742-001
PROLINEA 4/33, 4/66
1MB MOD 141682-001
2MB MOD 141683-001
4MB MOD 141684-001
8MB MOD 141685-001
SYSTEMPRO
2MB MOD 115144001
8MB MOD 116561001
32MB MOD 116568001
6 SOCK-EC 116569001
SYSTEMPRO/LT 386-25S, 486SX, 25S
1MB MOD 116688001
2MB MOD 116689001
4MB MOD 116690001
8MB MOD 128677001
8 SOCK-EC 129160001
CONTURA 3/20, /25
2MB MOD 139497001
4MB MOD 139498001
8MB MOD 139499001
CONTURA 4/25
4MB MOD 146520001
8MB MOD 146521001
16MB MOD 146522001
DESKPRO M-SERIES
SYSTEMPRO L1 486SX/25S & 325/25SE
2-64MB BD 129160 + 689
4-64MB BD 129160 + 690
8-64MB BD 129160 + 877
SYSTEMPRO/XL
16MB KIT 136818001
32MB KIT 136817001
128MB KIT 139918001
8 SOCK-EC 139593001
PROLINEA
1MB MOD 116688001
2MB MOD 116689001
4MB MOD 116690001
8MB MOD 128677001
16MB MOD 139517001
32MB MOD 149147001
LITE 4/25C
2MB CRD 142337002
4MB CRD 142337003
8MB CRD 142337004

hp

HP VECTRA 386/33H - 33H
2MB D2714A
8MB d2715A
HP VECTRA 286/12, ES12PC
2MB KIT D1354A
0-16MB E-C
386/16M, /20M
2MB KIT D2406A
8MB KIT D2404A
QS/16S, /16SPC, 20PC, 20C
2MB KIT D1354A
386/25PC, 486UPC
2MB MOD D2361A
8MB MOD D2152A
486S/20PC, 486PC, 48625T, 48633T
1MB MOD D2150A
2MB MOD D2381A
4MB MOD D2156A
8MB MOD D2152A
5000/375, 390, 345, 4000L 4005, 400T, 425S
8MB KIT H9629B
16MB KIT H9629D
32MB KIT H9629E
5000/425T
4MB KIT H9629C
8MB KIT H9629B
16MB KIT H9629D
5000/433S
4MB KIT H9229C
5000/425E
4MB KIT A2200A
8MB KIT A2201A
16MB KIT A2202A
5000/720, /730
16MB KIT A1979A
32MBN KIT A2512A
5000/750
16MB KIT A1979A
32MB KIT A1987A
5000/705, /710
8MB KIT A2216A
16MB KIT A2217A
32MB KIT A2218A
X-STATION 700RX
1MB MOD C2320A
2MBN MOD C2321A
4MB MOD C2322A
8MB MOD D2152A
DESSJET 500C, 500 PLUS, 550C
256KB MOD H2270B
LASERJET II, IID
2-4 E-C H334446
4MB E-C H334458
LASERJET IIP, III,
IIID, IIIP
2-4MB E-C H334758
3-4MB E-C H334768
4MB E-C H334778
LASERJET IIISI
4MB MOD C2065A
8MB MOD N/A
NP-4 - 4M - 4SI - 4SIMX - XL300
1MB C2063A
2MB C2064A
4MB C2065A
8MB C2066A
HP LASERJET FAX
1MB
PAINTJET XL300
0K EXP BD
HP DESIGNJET 600 INKJET
4MB C2065A
8MB C2066A

AST

AST PREMIUM EXEC, 286/12, 386SX/20
1MB MOD 500614001
4MB MOD 500614003
AST PREMIUM EXEC, 386SX/25, 25C, 25SL, 25SLC
4MB MOD 500614004

1 X 9 $CALL SIMMS
70 NS
4 X 9 $CALL
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SIMM-SIPP MODULES

4MB X 9-60NS SIMM-PC	CALL	256K X9-100NS SIMM	CALL	1MB X 9-70NS SIPP	CALL
4MB X 9-70NS SIMM	CALL	256K X 9-80NS SIMM	CALL	1MB X 9-60NS SIPP	CALL
4MB X 9-60NS SIMM	CALL	256K X 9-70NS SIMM	CALL	256K X 9-100NS SIPP	CALL
1MB X9-100NS9 CHIP SIMM	CALL	256K X 9-60NS SIMM	CALL	256K X 9-80NS SIPP	CALL
1MB X 9-80NS 3 CHIP SIMM	CALL	1MB X B-80NS SIMM	CALL	256K X 9-70NS SIPP	CALL
1MB X 9-80NS 9 CHIP SIMM	CALL	1MB X B-70NS SIMM	CALL	256K X 9-60NS SIPP	CALL
1MB X 9-70NS 3 CHIP SIMM	CALL	4MB X 8-80NS SIMM	CALL	256 X 36 – 1MB	CALL
1MB X 9-70NS 9 CHIP SIMM	CALL	4MB X B-70NS SIMM	CALL	512 X 36 – 2MB	CALL
1MB X 9-60NS 3 CHIP SIMM	CALL	1MB X 9-100NS SIPP	CALL	1 X 36 – 4MB	CALL
1MB X 9-60NS 9 CHIP SIMM	CALL	1MB X 9-80NS SIPP	CALL	2 X 36 – 8MB	CALL
1MB X 9-53NS 3 CHIP SIMM	CALL			4 X 36 – 16MB	CALL
1MB X 9-53NS 9 CHIP SIMM	CALL				
16MB X 9-70NS SIMM	CALL				

MOTHER BOARDS

OPTI	
386DX-33-64K CACHE W/CPU	199
386DX-33-256K CACHE W/CPU	249
386DX-40-64K CACHE W/CPU	210
386DX-40-256K CACHE W/CPU	260
486SX-25-64K CACHE W/CPU	349
486DX-33-64K CACHE W/CPU	490
486DX-33-256K CACHE W/CPU	540
486DX-50-256K CACHE W/CPU	749
FREE	
486DX-33 128K CACHE	537
486DX-50 256K CACHE	740
486DX-33 8-ISA,2-VESA 256K CACHE	612
486DX2-66 8-ISA,2-VESA 256K CACHE	894
OCEAN	
JAGUAR 386DX-40 128K	139
HIPPO 486DX-33 ISA 256K"Dynamic Cache"	448
HIPPO 486DX-50 ISA 256K"Dynamic Cache"	609
JAGUAR IV 486DLC-40 128K Math Co	319
JAGUAR VESA486DX-33 256K 2-VLB"Dynamic Cache"	569
AMERICAN DIGICOM	
486SX-25 ISA 128K	249
486DX2-66 ISA 128K	699
486DX-33 VESA 256K	469
486DX2-66 VESA 256K	729
SILICON STAR	
386DX-40 128K Cache	159
486DX-33 ISA 128K Cache	429
486DX-33 VESA 256K Cache	479
486DX-33 EISA 256K Cache	534
NICE Made In U.S.A.	
486DX-33 8-ISA, 2-VESA LB 256K	569
MINI 486DX-33 5-ISA, 3-EISA, 2-VESA LB 256K	642
MINI 486DX2-66 5-ISA, 3-EISA, 2-VESA LB 256K	903
486DX2-66 6-EISA 2-ISA 1 Meg Cache	1306
SUPER EISA 486DX2-66 8-EISA 1-VESA LB 512K	CALL!
A.I.R. Made In U.S.A.	
486DX-33 8-ISA, 3-VESA 256K P24T Socket	549
486DX2-66 8-ISA, 3-VESA 256K P24T Socket	809
486DX-33 EISA 256K	789
486DX2-66 EISA 256K	1049
VEGA Made in U.S.A.	
3/486DX-33 VESA 2-VL 256K,ZIF MULTI I/O IDE	519
3/486DX-33 VESA 3-VL 256K,ZIF	499
486DX2-50 ISA 256K	699
486DX2-66 3-VESA 256K	769
MICRONICS (U.S.A.)	
MX-30 486DX-33 VESA 256K	699
MX-30 486DX2-50 VESA 256K	889
GEMINI 486DX-33 VESA 256K	795
GEMINI 486DX2-66 VESA 256K	1249
MYLEX (U.S.A.)	
486DX2-66 256K MULTI I/O	1019
486DX-50 EISA 256K MULTI I/O	1239
486DX2-66 VESA 64K MULTI I/O	1049
486DX2-66 EISA/VESA 256K MULTI I/O	1299
AMI Made in U.S.A.	
SUPER VOYAGER LC 486DX-33 256K	903
SUPER VOYAGER 486DX-33 VESA 2-VLB 256K	903
SUPER VOYAGER 486DX2-66 VESA 2-VLB 256K	1543
ENTERPRISE III VLB 486DX2-66 256K	1604

SHAVO 486
2MB KIT 500510002
4MB KIT 500510008
SHAVO 486/25, 4-33
2MB KIT 500718004
8MB KIT 500780001
SHAVO 3-25S
2MBN KIT 500710004
8MB KIT 500824002
SHAVO 3-33LC
2MB KIT 500962001
8MB KIT 500962002
SHAVO 3863X
2MB KIT 500510002
4MB KIT 500510008
SHAVO 3863X20
2MB KIT 500710006
8MB KIT 500824001
SHAVO 4/25S, 433LC, 4500, 4460
ADVANTAGE PRO 4860X33, 4863X25
2MB KIT 500987001
4MB MOD 500987002
8MB KIT 500987003
16MB MOD 500987004
32MB KIT 500987005
PREMIUM 0 386/25, /33, 3863X/20, 486/33, 4863X/20, PREMIUM 3863X/16, 486/33E PREMIUM 386/33TE, 486/33TE
1MB MOD 500780003
2MB KIT 500780005
4MB MOD 500780004
8MB KIT 500780001
0-32MB E-C 500818001
OFFICE ADVANTAGE 3863X/20, 4863X/20
2MB KIT 500891001
8MB KIT 500891002
PREMIUM 386
4MB 500510004
POWER PREMIUM 3/33, 4/33 & 4/50
2MB KIT 500780005
8MB KIT 500780001
PREMIUM WKS1 286, 3863X
2-2MB KIT 500510002
4MB KIT 500510008
PREMIUM 386/16, C
4MB KIT 500510008
PREMIUM SE 4/33
2MB KIT 500780005
8MB KIT 500780001
PREMIUM SE 4/50
16MB KIT 500928001
32MB KIT 500928002
PREMIUM
4MB 501159001
8MB 501159002
16MB 501159003
32MB 501159004
MANHATTAN SHP
16MB 501143001
ADVANTAGE PLUS 4860X33 DX250 - DX266
4MB 500510008
8MB 500824001
AST POWER EXEC 4/25SL
4MB NA

NEC

ULTRALITE 286F
1MB 00 PC2221
4MB MOD PC2222
ULTRALITE SX/20
2MB MOD PC4421
6MB MOD PC4422
ULTRALITE SL/20, SL/20P
6MB MOD PC4921
ULTALITE IB, SL25C
2MB MOD PC4721
4MB MOD PC4722
8MB MOD PC4723
PROSPEED 286
1MB MOD PC2121
2MB MOD PC2126
4MB MOD PC2122
PROSPEED 386
2MB MOD PC3121
8MB MOD PC3122
PROSPEED 3863X
1MB MOD PC2121
2MB MOD PC2126
4MB MOD PC2122
PROSPEED 3863X/20
1MB MOD PC4321
4MB MOD PC4322
PROSPEED 4863X, 4863X/C
1MB MOD OP4106204
4MB MOD OP4106205
POWERMATE PORTABLE SX
2MB E-C APCH751X
8MB E-C APCH753-754
POWERMATE PORTABLE PLUS
1-3MB E-C APCH750J
2-3MB E-C N/A
3MB E-C N/A
POWERTMATE 386/16, /20
4-16MB E-C N/A
8-16MB E-C N/A
POWERMATE SX
2MB E-C APCH855
4-8MB E-C APCH853
8MB EC N/A
POWERMATE SX PLUS
2MB E-C N/A
4-8MB E-C APC852E
8MB E-C N/A
POWERMATE SX/16
2-6MB E-C OP4108201
2MB KIT N/A
POWERMATE SX/20
2MB CPU MODULE OP4188101
2-8MB E-C OP4100102
2-8MB N/A
POWERMATE SX/16I, SX/20I, SX/20V
2MB XIT OP4100103
8MB KIT OP4102101
POWERMATE 286C, 286 PLUS
1-3MB E-C APCH250K
2-3MB E-C N/A
3MB E-C N/A
POWERMATE 386/20
2MB MOD APCH655E
8MB MOD APCH656E
POWERMATE 386/25, 3863X25
2MB MOD APCH655X
8MB MOD APCH656X
8MB 8MB APCH657X
POWERMATE 386/25S
2MB KIT OP4105201
4MB KIT OP4105203
8MB KIT OP4105202
POWERMATE 386/33E, 486/25E
2MB MOD OP4105101
POWERMATE 386/33I
1MB MOD OP4106204
4MB MOD OP4106205
16MB MOD OP4106206
POWERMATE 486/33I
2MB KIT OP4108103
8MB KIT OP4102101
POWERMATE EXPRESS 486/33E, /50E
4863X/20E, /25E
POWERMATE EXPRESS TOWER 486/25TE, /33TE, /50E
486/SX25TE
1MB MOD OP4106204
4MB MOD OP4108205
16MB MOD OP4106206
SILENTWRITER MODEL 90 & 286
2MB MOD OP4892
SILENTWRITER MODEL 95
2MB MOD 9502
SILENTWRITER MODEL 2
2MB MOD 4892

PRINTER MEMORY

APPLE
PERSONAL LASER WRITER LB, NT
LASERWRITER IINTX, IINTXJ
LASERWRITER NF, NG
LASERWRITER IINTX
LASERWRITER SELECT 310
BROTHER HL-4, 4V, 4PS
HL-8, -8E, 8D, 8V
BROL1-410, BROL2-420
BL10DV, 14PS
CANON LPB-4, -4 PLUS, 4LITE
LPB-811
LPB 811I, -8PLUS
EPSON EPL 8000 L P
EPL 7000 L-P, EPL7500 L-P
ACTION LASER II ELP 4000, 4100, 5000, 8100
FUJITSU RX 7100, 7200N
KONICA LP311S, 311S
KYOCERA F1200S, F3200, F3300A
KYOCERA F820, F1600, F1000A, F3000A, F5000
OTICH-4 PLUS + RE
CITOH CI-6
CITOH CI-8
COMPAQ
PAGEMARO 15 & 20
DATAPRODUCTS LZR050
PAINTJET XL300
HP LASERJET FRX
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SAMSUNG NOTEMASTER 3863-16
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4MB
8MB
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T2000SX
4MB C-C PC14PA8314U
8MB C-C PC14PA8315U
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T1850, T1850C
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2MB C-C PCPA2006U
4MB C-C PCPA2007U
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8MB C-C PCPA2009U
16MB C-C PCPA2010U
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2MB C-C PCPA2003U
4MB C-C PCPA2004U
8MB C-C PCPA2005U
16MB C-C PCPA2010U
32MB C-C N/A
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2MB MOD PC13PA8306U
T1600
2MB MOD PC8PA8302U
T3100
2MB MOD PC3PA7135E
T2100E
2MB KIT PC9PA8341U
T3100SX
2MB MOD PC15PA8308U
4MB MOD PC15PA8310U
T3200
3MB MOD PC6PA7137U
T3200SX
2MB KIT PC12PA8307U
4MB KIT PC12PA8309U
T3200SXC
2MB KIT PC19PA8318U
4MB KIT PC19PA8319U
T5100, T5100C
2MB MOD PC7PA8301U
T5200, T5200C, T8500
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2 1GB MC1926 SCSI-2	11MS	3.5"	1845
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SCSI			
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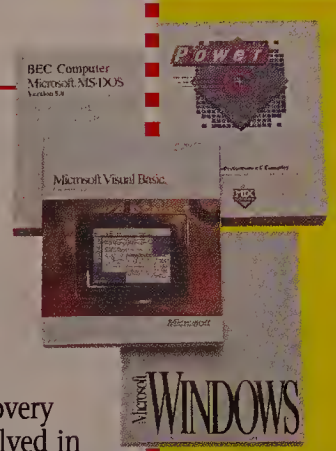

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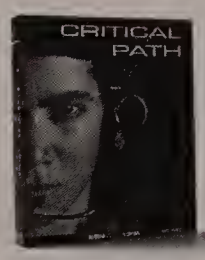

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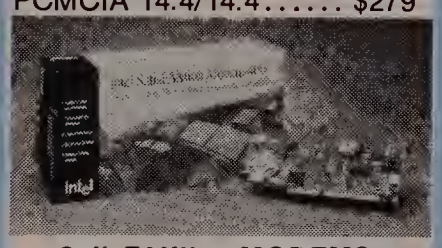

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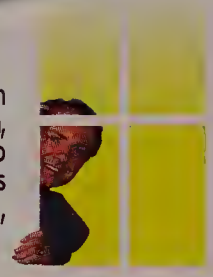

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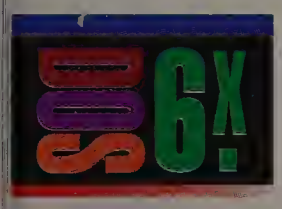

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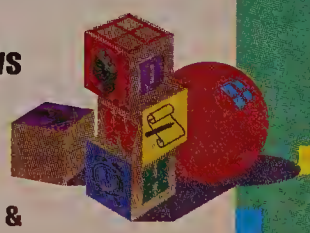

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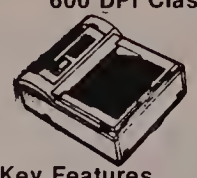

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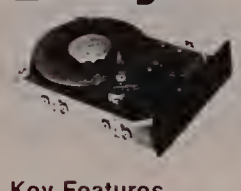

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953 DTP/Presentation software
954 Monitors and video boards
955 Accounting software
956 Draw/paint software
957 Network/sharing products
958 Printers
959 Multimedia products
960 Utilities
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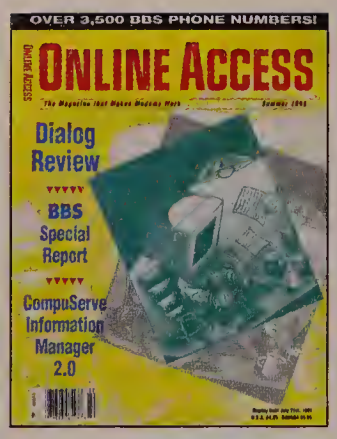

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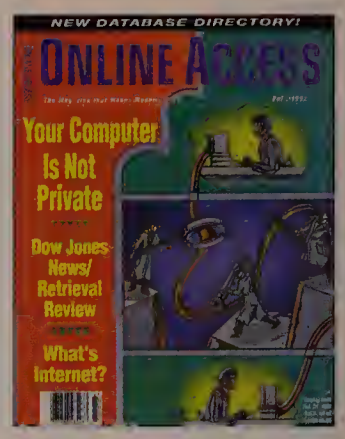

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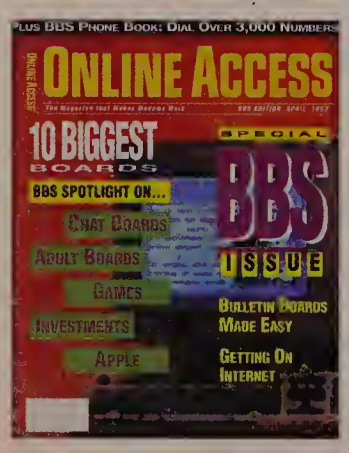
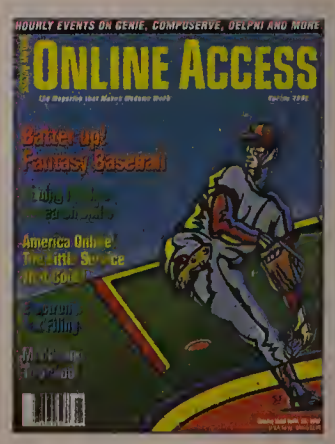




ONLINE ACCESS

Exploring the Universe, the Lair of the Lizard, and the Roulette Table

If you're one of those star-struck, deep-space fanatics who dreams of exploring the universe, Distant Suns, an impressive, Windows-based software toy, could be a lot more fun than blasting Space Invaders.

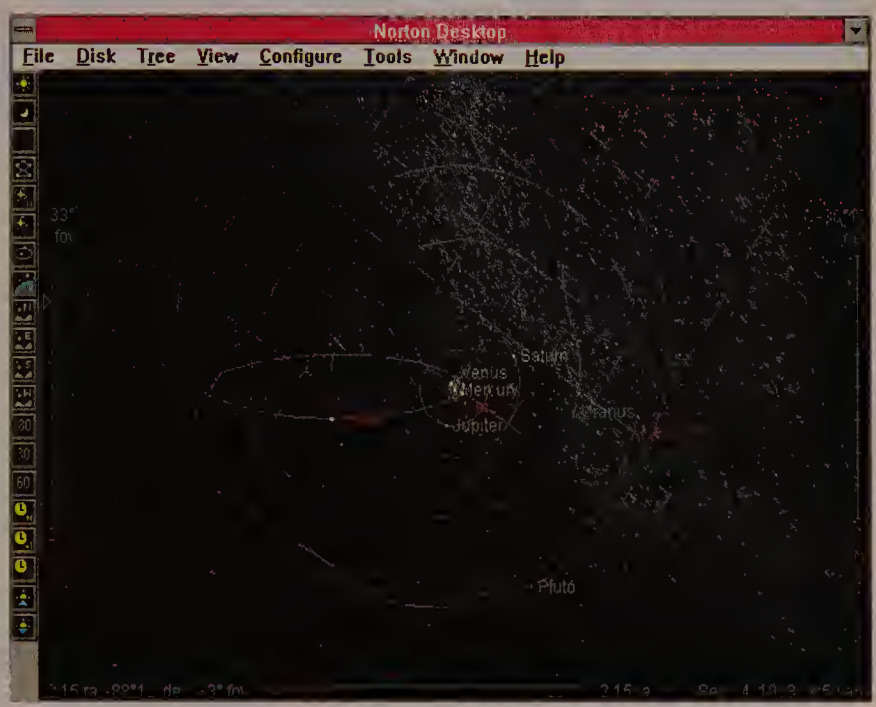
Distant Suns turns your PC into a planetarium. You can display pictures of the night sky from any place on (or off) earth, and on dates from 4713 B.C. to 10,000 A.D. That means you can view any number of spectacular stellar events (like solar eclipses, for instance) from any perspective, at any speed. More than 9000 stars are built into the database, along with countless comets, planets, galaxies, nebulas, and star clusters. There are also maps of the moon, photos of Venus, and detailed information about all these celestial objects.

There's only one drawback to Distant Suns: It's s-l-o-w. You may find yourself grinding your teeth (or pricing a coprocessor) as you wait for the screen to update. Still, this is a terrific program to put on your notebook and take out into the night, where it will help you identify every star and planet visible from your backyard. Space has never been closer—and as we all know, space is the place.

Flirt, Dance, Slay Goblins

The Kingdom of Drakkar is a thrilling, multiplayer adventure in which players join together via modem to venture into an exciting world of fantasy and danger. The experience is uncannily convincing. It's the closest I've come to actually becoming a swords-and-sorcery character or living out a Tolkien novel. You'll need to learn complex commands and procedures, but once up to speed you'll find Drakkar seriously addictive.

You start out as a merchant in the city of Nork. You'll apprentice in a profession—fighter, thief, healer, martial artist, and so on—and set out on your explorations, slowly rising through the ranks as you gain experience, money, and skill. You journey far and wide in search of adventure and success. But the best part of Drakkar is the other players. You can forge alliances, flirt, dance, trade information and weaponry, and even exchange snappy repartee while you're blowing away the goblins. And since the system remembers where you were when you logged out, the next time you dial in you can pick up where you left off. Of course, if you were part of a monster-fighting expedition, your comrades will probably be gone—but the monsters won't.



Turn your PC into a planetarium with Distant Suns, where the solar system is just the start of your adventure.

The interface is an odd hybrid of old text-based adventure games (with commands like look north, pick up longsword, attack orc) and the latest mouse-based graphical interface. The on-screen display is quite nice: You seem to be floating over a detailed, full-color landscape of rooms, passageways, caverns, and open country. You, your fellow adventurers, and the monsters all appear as graphic characters, and you can use your mouse to perform basic tasks like picking things up, putting things on, and moving around. But serious players looking for the utmost in speed will still find themselves typing a lot of commands. Talking to other players also requires typing.

I encountered some annoying technical problems. I had to reinstall three times before the log-on utility would dial in. Then unexpected freezes in the game required me to hang up and redial a few times. And sometimes the screen did not repaint, leaving blackness where the next room should be.

But once I got past the obstacles, I was truly enchanted by the realism—and the fun of real-time interaction with other players. My friend Betti (whose Drakkarian alter ego is Phantom) met me at the tavern and walked me to the bank, where she gave me several thousand gold coins and an amulet. Then, while she bargained with another player for an uzi (not a machine gun, an energy-enhancing charm), I made my way to the martial arts dojo where I began my training as a kung fu warrior.

Phantom and I descended into the dungeons. We fought back-to-back, slaying a slew of creatures and taking their treasures. And since Phantom is a healer, she cast spells to keep me healthy. Several times we were joined by friendly passersby who helped us hack our way through the demon hordes. Finally, Phantom and I went looking for the Lizard King, intending to put some hurt on him. But when we got to his lair he was out. Probably sliming other players.

Fortunately, given its habit-forming (hobbit-forming?) nature, Drakkar is relatively inexpensive. If you log on via

By Michael Goodwin

YOU ARE IN A WORLD OF TROUBLE in Drakkar. True, you have just knocked off one Elemental, but another one is getting closer.

MPG-NET's New York number, you'll pay only $2 an hour; using one of the national access numbers adds another $2 per hour. There's no sign-up fee, no monthly charge, and new players start out with five free hours. MPG-NET offers other games, too.

I wonder if the Lizard King is back yet....

See Your Cash Disappear

Ruckus Roulette is a casino simulation that scrapes within a hair's breadth of being a big winner, only to lose its chips in the end.

You get to exercise every option you would sitting at a table in Monte Carlo or Winnemucca: You can place "inside" bets, make "outside" wagers, and sit at the table with a bunch of low-life gamblers and watch your money disappear. Hey, you might even get lucky and win a little cash; it does happen.

Several learning functions make Ruckus Roulette even more fun than the real thing. Odds against the various bets—including the house edge—appear automatically when you lay your money down, and there's a Simulations mode in which you can spin the wheel up to 30,000 times to see how much you would have won or lost.

The graphics interface is where this simulation falls flat. You don't see the ball fall into the slot on the spinning wheel, and the table display is so small and the croupier's marker so hard to see that it's pretty tough to tell what number is the winner, or what your fellow gamblers are betting. Still, considering the buy-in is only $12.95, I've seen worse bets.

- **Distant Suns 2.0 floppy disk version** $69.95, CD ROM version $149.95; Virtual Reality Laboratories Inc.; 805/545-8515
  Reader service no. 608
- **Drakkar** $2 to $4 per hour; MPG-NET; 800/438-4263
  Reader service no. 609
- **Ruckus Roulette** $12.95; Villa Crespo; 708/433-0500
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Michael Goodwin is a contributing editor for PC World. *He can be reached on PC World Online (see page 12 for contact information).* ■

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Lightening Up Windows

One of the wonderful things about Windows programs is that many of them let you be efficient and productive while you have fun. Take it from a licensed counselor: A little frivolity in a frantic day is a useful commodity.

There are days when I'm as scattered as my hard disk and I just can't remember what I'm supposed to do. Instead of straining my limited cerebral resources, I rely on Velocity's Remind Me to oversee all my single and recurring events. Yes, I've got a PIM with alarms, but nothing gets my attention quite like Remind Me's Daffy Duck, Sylvester the Cat, and Road Runner (all licensed from Warner Brothers) popping up on screen and talking to me.

Remind Me takes little skill to operate, yet it's powerful enough to let me manage my reminders in almost any daily, weekly, or monthly combination. At about 2 p.m., for example, the program nudges me to get outgoing mail ready for the mail carrier. I've set up Remind Me to launch programs at specific times. Twice a day it fires up cc:Mail Remote—accompanied by a drum roll—and checks for E-mail. I won't deny you the pleasure of discovering Remind Me's gags on your own, but try the Buzzsaw animation first. • *Remind Me $49.95; Velocity Development Corp.; 415/776-8000, 415/982-3299 (fax). Reader service no. 603*

Iconography

If you use Windows, you may have discovered that some icons are neither helpful nor attractive (the ugly Program Group icon in Program Manager comes to mind). I've left these behind with Moon Valley's Icon Hear-It, an inexpensive program that allows me to manage and personalize every icon on my system easily. In addition to its library of 400 icons, the program supplies custom and animated cursors, screen savers, and animated icons.

Icon Hear-It also lets me attach any sound file—about 100 are included—to any Windows function. And that's just what I did for about an hour, by which time the novelty had worn off. Still, if used selectively, these sound effects can be worthwhile tools. I assigned a vocal "uh-oh" to the program that alerts me when my system resources drop to a dangerous level.

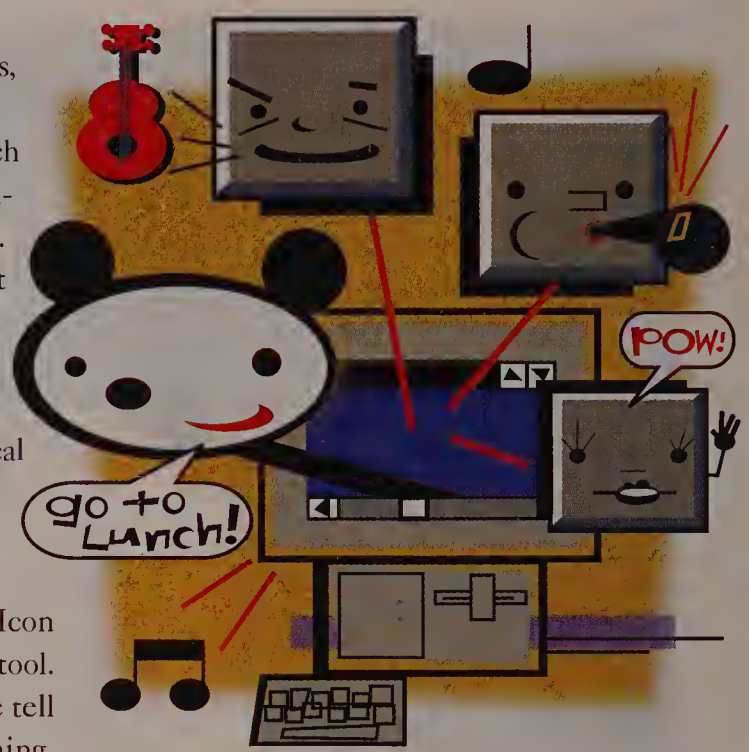
If you're teaching new users, Icon Hear-It is a pretty cool training tool. The right sounds at the right time tell novices they're doing the right thing. I've put Icon Hear-It on my brother-in-law's PC. Now when he calls to ask me how to minimize a group, I can tell him, then wait until I hear the thud to know he's gotten it right. (On the other hand, if I hear sirens, I know he blew it.)

Cheap Sounds

Not sure if sounds interest you, but you'd like a free trial? Download a copy of Whoop-It-Up, a shareware sound program that's similar to (but not as powerful as) Icon Hear-It. It's available as WHOP20.ZIP from PC World Online (see page 12 for information).

If the thought of designing your own icons sounds like fun, there's Icon Make-It. This program contains every conceivable tool for rolling your own, from animated dancing raisins to spinning CDs. You'll find that the icons you create are much easier to understand and locate than the plain-vanilla versions. • *Icon Hear-It $39.99, Icon Make-It $69.99; Moon Valley Software; 800/473-5509, 602/375-9502. Reader service no. 604 • Whoop-It-Up $29.95; Starlite Software; 314/965-5630, 314/966-1833 (fax), 314/966-4856 (BBS). Reader service no. 605*

For years I've resisted the temptation to install a screen saver; they take up precious disk space and system resources. But I've succumbed recently because screen savers have become a major form of entertainment.



There are plenty of shareware screen blankers around. My favorite is the Magic Screen Saver, which offers several advantages over Windows' own screen saver: It uses fewer resources, offers "sleep" corners for instant blanking, and has easier password protection—without the expense or hard disk outlay of After Dark. It's available as MAGIC.ZIP on PC World Online. • *Magic Screen Saver $25; Software Dynamics; 403/240-0103, 403/240-0105 (fax). Reader service no. 606*

One last thing: Most of these programs will support your three-inch PC speaker, but they're a lot more fun with a sound card. Okay, okay; I know this might be a stretch for some of you—sound cards cost money and can be difficult to install. But when 5 p.m. rolls around and it's time for me to make the long commute into the kitchen, I can take a break with the sound card for serious diversions like Wolfenstein 3-D or Microsoft's Arcade.

Contributing Editor Steve Bass is president of the Pasadena IBM Users Group. He can be reached on PC World Online (see page 12 for contact information).

By Steve Bass

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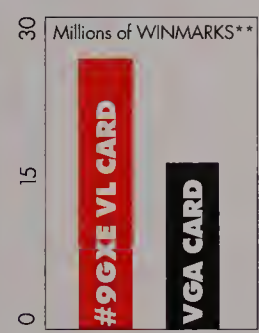

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*†1993 J.D. Power and Associates Desktop Personal Computer Satisfaction Study conducted among 1,956 user respondents. *Source: Intel Technology Brief, Pentium Processor.*